

AVIATION WEEK

A McGRAW-HILL PUBLICATION

DEC. 8, 1952

50 CENTS



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The Douglas A2D "Skyshark" is the latest in a long line of Navy planes 100%-equipped with Goodyear Tires, Tubes, Wheels and Brakes — selected again for their proved ability to withstand the strains of carrier deck landings and take-offs.

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MACMILLAN MEMORIAL TROPHY

"...most effective in furthering the safety of aircraft..."

The Macmillan Memorial Trophy, known throughout the world of aviation, is an annual award to the group, body or institution that has recently made the contribution, development or improvement which by its practical application has become more effective in furthering the safety of aircraft with special reference to passenger aviation or diversity in increasing the efficiency of aircraft.

The Trophy was established in 1938 by citizens of Anchorage, New Zealand, in memory of Capt. Elton C. Macmillan and his two companions in the "Jameos Clipper" who were lost in the South Pacific on January 12, 1938 while making the first commercial flight from the United States to New Zealand.

For its contribution in furthering the safety of transoceanic aircraft, the Sperry Engine Analyzer has recently won the Macmillan Memorial Trophy for 1951. This award was made to John E. Lindberg, Jr. and James W. Wheeler who jointly developed the Analyzer. At the time of this development, Lindberg was a staff engineer in the Pacific-Alaska Division of Pan American World Airways and Wheeler was head of the engine maintenance department

of the Sperry Gyroscope Company.

Awarded for its contribution to flight safety, the Analyzer is in wide use on commercial and military planes throughout the world. It immediately detects, locates and identifies derailed ignition and mechanical troubles in aircraft power plants either during flight or on the ground.

Sperry Gyroscope Company
Division of the Sperry Corporation
Great Neck, New York

NEWS DIGEST

Domestic

Minneapolis-Honeywell says that an new E-11 automatic pilot, altered for use on the new twin-jet Douglas DC-6, is also designed for use on military aircraft which can sometimes require the pilot to be in the cockpit setting trans-airs provided by the plane's radar and computer. M-H says a has asked for E-11s for use on the DC-6 (as reported in AVIATION WEEK Sept. 1956) but maintains no possible fighter or interceptor application. The E-11 is reported under consideration for use on the new McDonnell

Joseph Adams, Civil Aviation Board member, has been appointed by the President to succeed former CAB Chairman Donald Noyce on the National Advisory Committee for Aeronautics (NACA).

Flight Refueling, Inc., Dunbar, Conn., will close under the control of an American group which includes Robert Motter, Inc., Rockville, Md., and investors, according to an agreement transacting, contractor's latest from Flight Refueling, Ltd., Duxford, England. The agreement is subject to stockholder approval and other conditions.

William P. Frazee has been appointed manager of the Air Transport division of the Flight Safety Foundation.

Aircraft Industries Assn. of America reports 272 passenger and executive aircraft were registered during the month of October, including 310 four-place or larger and 12 one- and two-place planes. Value of aircraft is \$2,624,660.

St. Gobain de Houdain has presented with the Dowell Cylinders award "for 40 years of pioneering an industry and commercial benefit and the development of long range jet transport" at the annual banquet of American Society of Mechanical Engineers at the Statler Hotel, New York, last week.

William Lefebvre, vice president-engineering, American Airlines, will give the ninth Wright Brethour Lecture Dec. 17 at Washington, discussing "Technical Trends in Air Transport 1956."

Eastern Air Lines Constellation flight engineers last week went on strike, crippling much of the carrier's opera-



ATTENDING SAFETY MEET sponsored by Flight Safety Foundation in Brussels recently were (left to right) Arthur Jevins, CAA, Charles Donald Noyce on the National Advisory Committee for Aeronautics (NACA).

tions. Wall Street reacted from a price dip and disappearance over a new one cent Dowd E&I Common was suspended since flight engineers are not used on other commercial planes.

Selig Alabek, independent aviation consultant and contributing financial editor of AVIATION WEEK, delivered the aviation lecture at the New York Institute of Finance for the fourth consecutive year. He discussed airlines Nov. 20 and the aircraft group Dec. 4. The institute is affiliated with the New York Stock Exchange.

Financial

Northwest Airlines reports net an income after taxes of \$149,661 for the month of October. Net income for the first 10 months of 1952 was \$1,512,999 from total revenues of \$46,513,160.

Northwest Airlines has declared a regular quarterly dividend of 23 cents a share payable Dec. 17 to stockholders of record Dec. 3. Net income after taxes for the three months passed and Aug. Oct. 31 was \$1,500,955, including income from Rockford Co., a wholly owned subsidiary. Building in of Oct. 31 was \$502 million.

British Overseas Airways has under consideration a civil version of the aircraft de Havilland 695. Volume

British European Airways will take delivery on the first of 26 Douglas aircraft transports, recently certified by the Air Registration Board. A second production Douglas is about ready for flight tests.

Paul A. V. Rothfeld, Comsat founder, made his first flight Nov. 25, two years and two weeks after the firm commenced production.

The Canadian Department of Defense Production ordered aircraft, aircraft, spares and aircraft materials \$187,500 during the first half of November. Liquid fuel (\$52,500) went to Canadian Lhd. Montreal, for engine maintenance stands.

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Put **ARC** On the Map



On air map or road map of New Jersey, you will see the name "Aircraft Radio" marking our location just N.W. of Boston.

Name doesn't appear on the map overnight. It takes stability and reputation. And as we approach our 25th anniversary, it is gratifying to know that A.R.C. has been "put on the map" in another sense, too. All over the world, A.R.C. is known and our communications and navigational instruments are widely used and trusted.

A.R.C. has become a standard of excellence in its field because it is qualitatively far superior to price. And each unit goes the basis of our promise—plus 24 years of specialized engineering experience.

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ARC
Aircraft Radio Corporation
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AVIATION CALENDAR

Dec. 12—Second Convertible Aircraft Convair, The Franklin Institute, Philadelphia.

Dec. 17—Annual Wright Bee Awards, 7:30 p.m., Statler Hotel, Washington, D. C. Wright Bee Award to be presented by EAA's president, U. S. Chamber of Commerce, chairman.

Jan. 12—Bee-Award meeting and engineering display of Society of Automotive Engineers, Statler Hotel, Washington, D. C.

Jan. 14-16—AIAA/DPNSC Conference on High Frequency Measurements, Statler Hotel, Washington, D. C.

Jan. 15-16—Fifth Mason-Canton Society Operators Training School, University of Illinois, Urbana, Ill.

Jan. 16-25—Fleet Maintenance Conference, Philadelphia, Pa., Chairman, O. L. Johnson.

Jan. 19-25—Winter annual meeting of the American Institute of Electrical Engineers, Hotel Statler, New York, N. Y.

Feb. 13—New York Section of the Institute Society of America, Hotel Statler, New York, N. Y.

Feb. 15-19—Eight Annual Society of the Plastics Industry, Roosevelt Hotel, Washington, D. C.

Mar. 10-11—Eleventh Annual Conference, Society of the Plastic Industry, Canada, General Brock Hotel, Niagara Falls, Canada.

Mar. 13-15—National Production Forum of the SAE, Hotel Statler, Cleveland, Ohio.

Mar. 31 Apr. 1—Tiedt International Mapmakers' Exposition, National Coast Areas, Washington, D. C.

Apr. 4-12—Second Annual International Motor Sports Show, Grand Central Palace, New York, N. Y.

Apr. 18-20—Aeronautics Production Forum, Ninth Annual Meeting and Aircraft Engineering Display (SAE), Hotel Governor Clinton and Hotel Statler, New York, N. Y.

May 13-18—IEEE National Conference on Antennas and Propagation, Dayton Auditorium, Dayton, Ohio.

May 18-22—Fifth National Materials and Design Exposition, Convention Hall, Philadelphia.

June 9-11—Second International Aviation Trade Show, Hotel Statler, New York, N. Y.

Oct. 16—International Air Race, England to Croydon, England, via Belfast.

Sept. 7-10—1953 SAE Convention, New York City, Pennsylvania, Philadelphia.

Sept. 16-17—Fourth Anglo-American Aircraft meeting Conference, London.

PICTURE CREDITS

T-Bermuda: Vickers V-Storage Aircraft Co. (U.S.); Lockheed 17-Midnight: Hill-Wood Co. (U.S.); Lockheed 100: Lippisch (U.S.); Lockheed 100: Goss (U.S.); 10-Easy: International Co.; 10-Main: Goss; Hill-Wood: Morris; 41-31: Lippisch: U.S.; Fairchild: Murphy & Murphy; 41-31: Fairchild: Murphy & Murphy; 100: Goss.

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3



2



Boeing YB-52 Stratofort Heads 'Upstairs'

With its eight powerful Pratt & Whitney J57 split-compression turbojet engine, the mighty Boeing YB-52 Stratofortress takes off from Boeing Field, Seattle, Wash., on one of its maximum flight tests. This unusual photo sequence gives the reader the impression he is standing near the runway



6



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1

Remington Rand Methods News

Let's talk control methods at Cleveland Maintenance Show

Many types of effective records for maintenance control can be studied at Booths 307 and 311. Public Audit room, Jut. 29-22.

For profitable size approaches to the record-keeping problems of a maintenance department, there's nothing like seeing how other firms get results. Also, at the Maintenance Show, we will be delighted to see a new display of time maintenance control — demonstrated for the first time anywhere.

And, naturally, we will show you many of the procedures and materials used in methods developed by Remington Rand. If you can't visit us on the Cleveland, be sure to read copies before for helpful information on subjects of interest to you.



Look to your preventive maintenance record for help in keeping plant output at peak.

As production equipment grows more complicated, a breakdown becomes more costly. Preventive maintenance must be used than ever for plant efficiency. Your records must help prevent the failure — or start.

Maintenance superintendents who have learned to keep paperless systems like our simplified mobile methods which save maintenance costs will continue clerical work.

The plant engineer puts all the facts for determining when it will pay to replace a part or machine. He has a complete and convenient history of service and repair costs, as well as depreciation on the equipment.

These methods visually signal the next inspection date for every piece of equipment, tell what inspection is needed, prevent scheduling of work ahead. Every man's time can be planned for maximum efficiency. Maintenance work looks like it should.

Also, these methods eliminate the guesswork on proper interval between inspections. Decisions can be made on the basis of actual experience for each type of equipment.

Likewise, the records help the engineer decide on the anniversary breakdowns, revealing whether the failure was due to improper storage or careless maintenance work.

The plant engineer puts all the facts for determining when it will pay to replace a part or machine. He has a complete and convenient history of service and repair costs, as well as depreciation on the equipment.

These methods are flexible, can be adapted to your own special needs. See how they have been tied in with preventive maintenance methods, adapted to special types of equipment such as electric motors, etc.

Study the procedures and methods as well as preventive maintenance and property records and accessibility in many well-known plants. Ask for folder K-1454 and K-762, also for methods file MG-722 which is available on a ten day loan.

Get better maintenance from smaller inventory

There is a firm of 2,800 employee operating on a total maintenance inventory of only \$20,000 which turns over at the rate of once every 3 years. What's more, they don't have to worry about running short of any part or material needed to keep the plant running.

This achievement was made possible by continuing the inventory record and the purchasing of maintenance supplies under a control system which Remington Rand designed and installed.

Previously, individual department heads had done much of their own buying. This led to wasteful duplication of stocks. Likewise, they passed up the valuable savings of volume buying because each plant bought from its own sources. Nor could they get the service which comes with planned buying.

Previously an entire department might be shut down for half a day while part is being purchased when it was not needed. Now the stocks cannot fall below a safe minimum at any time without causing a shutdown.

Let us show you how such a system can work for small plants or large — with minimum paperwork. Ask for our new methods file MG-862.

QUICK RELIEF FOR COMMON MAINTENANCE HEADACHES

A small problem can grow into a big headache if it's the wrong one.

For instance, if parts and maintenance bring all kinds of trouble — breakdowns and repair delays, disgruntlement and dissatisfaction. Find the cause in simple identify and check out methods. Then, if necessary, refer to the key factor of every step from diagnosis to curing. See how our engineers have helped other firms accomplish this in minutes and hours. Ask for booklet MG-20.

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Washington Roundup

Money Picture

Here is what to expect in aircraft letting and spending for aircraft and related procurement:

- A slight lag in Air Force contracting.
- USAF contracting has been going forward at a high rate. During the first four months-July to November-USAFAF obligated \$5.8 billion or almost half of the \$12 billion it has available for the 1953 fiscal year.
- The same plan USAF has only \$6.2 billion left for contract letting over the eight months from November to the end of the year, July 1.
- A substantial increase in Baker procurement contracts.
- The lag in Navy's aircraft procurement program can extend through October. The \$56 million obligated in that month compares with \$719 million in October 1951.
- During the first four months of the current fiscal year-July to November-Baker contracting averaged only \$194 million per month.
- The rate will have to be stepped up to an average \$340 million a month over the eight months from November through June, if Baker is to use up the \$5.3 billion it has available for plane and related procurement for this fiscal year.
- Unlike the rate is sharply stepped up so soon, the Baker program faces difficulty. Congress has banned contract letting during May and June at a rate higher than 125% of the average for the 16 preceding months. Its purpose is to serve a moratorium by government agencies to reduce funds to go over for the next fiscal year.
- A big increase in spending for aircraft money presents no account.
- The 1953 fiscal year program calls for an expenditure of \$5 billion for aircraft and related procurement by USAF and Baker.
- In fact only \$2.3 billion was spent during the first four months-July to November.
- This leaves \$2.7 billion to be spent over the next eight months.
- If it isn't spent, the services are up for some congressional rebuke. They planned that a rolling on spending would mean deliveries of planes and other equipment would have to be slowed down. Congress reluctantly lifted the ceiling. But apparently the services aren't able to spend money scheduled for aircraft procurement for months anyway.

Eisenhower on Defense

President-elect Dwight D. Eisenhower put down three basic concepts for U.S. defense policy in congressional testimony a year and a half ago:

- U.S. self defense policy "holding" the land area of Western Europe.
- The main responsibility of a large force to be borne by the Allied nations.

His spokesman, "In Western Europe exists a great industrial base that is second in its capacity to that of our nation. If we take that while complete with its potential for military exploitation and transfer to our use in another role, the military balance of power has shifted so drastically that our safety would be greatly imperiled. The importance of the Western European group of nations is now greater than that. They have with many areas of the world close blood, political and economic ties. It is morally possible to imagine the fall

of Western Europe to Communism without the usual becomes full of certain of these postures, particularly those, and last phase, which have a political aspect can upset the European peace, the very areas from which we draw the materials which are absolutely essential to our existence-manganese, copper, arsenic, for example."

Otherwise, "stability"-ability to merit aggression in one direction-is the key to U. S. defense. The means are power to keep control of the air and sea lanes.

Eisenhower's comment: "I believe two things. First that our great strength lies in our central position with our ability to move in the directions that we see ahead of us. Therefore, we must maintain our air control. We must have great air power, not only intercessions, but planes to protect the air lanes and routes forward. And to do this that we have a special relationship between us and Western Europe, and that we must take what steps are necessary cooperatively to insure our own defense."

Otherwise, I say that our special strength is that mobility and being in this central position."

Democratic Supporters

At an 1948, Washington attorneys handling airline accounts were among Democratic National Committee's most generous financial supporters.

The committee spent these contributions received from June 1 to Oct. 29:

Paul Porter of Arnold, Faust and Porter, representing PAA, \$100.

John L. Silliman and John Shau, of Beaman, Silliman and Shau, which have represented the regional air carriers on several Senate separation legislation, \$1,000 and \$100, respectively.

Bonnie Connelly, former Airlines Council, of Case, Bonney, Connelly, \$1,100.

L. Welch Tropic, former CAB chairman, of Pogue and Nel, which represents Western Air Lines and Alaska Airlines, \$1,200.

Milford Tydings and Alton Ladd, of Davis, Rich, Tydings, Beale and Ladd, which represents Freight Air, Inc., Seaboard and Western, and Colonial Airlines, \$4,000 and \$2,000 respectively.

Clark Clifford, who handles TWA and Pan Am, Inc., \$1,000.

John Connelly of Whitehead, Hart, Connelly and Williams, counsel for Trans World Airlines, \$100.

William J. Dwyer, former chairman of the Democratic National Committee, who handled a United Air Lines account worth \$30,000, \$1,250.

Louis Johnson, counsel for PAA, \$1,000.

Others prominent in aviation who were listed among Democratic contributors: Robert St. president, Const. Mutual Airlines, \$1,200; Jack Free, former TWA auditor, \$1,200; R. S. Reynolds, president, Reynolds Metals Co., and wife, \$1,000; Arthur Glazier, Washington representative, Price & Whitney Aircraft, \$100. Thomas Ressert, former head of CAB's airport program and now Washington airport consultant, \$100. Donald N. Rapier, former CAB chairman, \$100. J. Carroll Case, PAA audit site president, \$2,000. Russell S. Adams, PAA vice president, \$200.

-Katherine Johnson

UAL Presents Case Against Coach Seating

- Patterson's attack on safety rocks industry.

- CAA holds closed-door session to hear story.

By Lee Moore

United Air Lines President W. A. Patterson carried his case against high density seating to Civil Aviation Administration and Civil Aeronautics Board in Washington last week. Patterson, armed with results of simulated crash emergency evacuation operations, told CAA Administrator Charles Horne that the high-density seating arrangement for 80 seats already has-a safety hole.

Patterson pointed out he can in a three-hour rescue behind closed doors before an audience consisting of Horne, CAB Chairman Gerald Ryan, CAB members Clark Garrison, Jack Lee and Joseph Adams and their technical staff.

CAB members were present at the hearing only as observers since any formal proposal for a change in air safety regulations such as proposed by Patterson would require public CAB proceedings.

The transport safety-airline and passenger panel, headed by Patterson's predecessor, confirmed of crash safety standards as far as consequences to CAB and CAB, and in his nationally distributed post-which he believed best suited seating in a "safety tunnel."

► **Horne Answered**—Charles Horne, to whom Patterson addressed his main attack, responded by congratulating Patterson on his "invaluable" desire to provide a higher degree of evacuation safety than that required by existing regulations.

CAB members and staff as well as airline officials privately told *Aviation Week* that the transport panel's measured challenge is a move to vindicate in his own mind his former chief—now deprived and retired by the rest of the industry—that strength would not yet. Reducing the seating capacity, as he has now done, will make it easy to put pressure back from airlines and CAB officials say.

Airlines executives were reluctant to comment for the record, however. They fear that public debate may score many negative cost comparisons and induce congressional to call for lower seating

Aircoach Seating

Plane	Airline	Passenger Capacity	Passenger Per Seat
DC-4	Capital ¹	40	13
	Eastern ²	55	16
	National	48	14
	Northwest	48	15
	TWA	48	12
DC-6	United (New)	54	11
	North American ³	78	16
DC-6	American ⁴	88	11
DC-4B	Pan American	82	7
Constellation	Eastern ⁵	60	9
	TWA	61	10
Super Constellation	Eastern ⁶	86	9
	Pan American	89	7
C-46	—	—	—
	Most Northwest	45-50	11-12

Maximum Allowed by CAB^{**}

Overseas	No. Seats	Max. (Last, Curr.)	Authored Airline	Airline
DC-4	50	5	37	—
C-46	47	4	37	—
DC-6	87	7	32	—
Constellation	97	9	32	—
Super Constellation	98	8	31	—
Super G	96	8	31	—
DC-4B	103	10	30	—

¹ Eastern and Capital use the same planes for first-class and coach service. ² EAL on DC-4 and Const. Capital on DC-4 only.

³ North American is the largest consolidated airline operation.

⁴ American is converting its existing DC-4 coaches from 30 to 40 passengers, and is increasing one standard DC-6 to 40-passenger coaches.

⁵ CAB Special Regulation No. 107, issued 1952.

domain. One airline official told *Aviation Week*, "We feel that the last two years have called into question the safety of the aircraft." He said that it would be "most detrimental to our industry if their is not a 'ring, look and listen' attitude toward that company toward each airline, which has been going on now for several months."

He added, "To on [United] the carrier situation is a most serious one."

There has been pressure for the expansion of aircraft services.

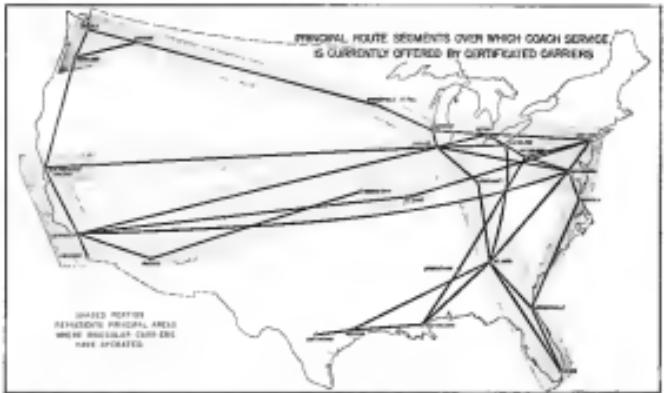
In addition to his focus on emergency exits, Patterson wrote CAB that

ing in rapidly gets catch as they have to add seats, we wrote, "are trying to make up for the lack of other airline operations outside the United States." He said that it would be "most detrimental to our industry if their is not a 'ring, look and listen' attitude toward that company toward each airline, which has been going on now for several months."

He added, "To on [United] the carrier situation is a most serious one."

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In addition to his focus on emergency exits, Patterson wrote CAB that



High-density coach seating of scheduled and unscheduled airways has brought 25-35% lower fares to most major, will reach all now.

"we have the opinion of two independent authorities whose views would be most detrimental to our industry," unless coach expansion is slowed down.

One of these two authorities is put forward by the Council Aeronautical Laboratory, which conducted the tests under private contract. However, Council immediately denied that it had made a qualitative judgment of that test.

• **Test.** And both Air Transport Association and Delta and CAA test medical drugs that Dr. Jerry King and the Council tests showed about the same results. The tests were made by CAA, CAA, Airline and Military Air Transport Service. CAA safety test officer Wendell E. Kossowski said tests indicate that it would take three minutes to evacuate a DC-4 coach with an average passenger load. However, he pointed out that as time could actually double as an emergency and that evacuation conditions vary greatly.

• **Regulation.** CAB had decided on the present regulation that halving safety in economy, as it went in over safety regulation. CAA had already given permission to one airline to carry over 100 passengers on special DC-4 flights for evacuation tests. That was high, CAA decided, that the other existing maximum passenger load could only be obtained with a special waiver to one airline.

Since the DC-4 is an old design, CAA had to be lenient in establishing "conservative" loads on its payload. The Board decided on a maximum seat capacity of 86 persons, giving a ratio of 17 passengers per seat. The Board's regulation is progressively safer, decreasing on newer aircraft (see box, p. 15), as it is easier to maintain safety regulation. Despite some leniency of the past, when DC-6 and Constellations had been wanted to provide more seats, no CAB had brought them monogram man-power down to 12. On these newest jumbo-jets—DC-8 and L-1011—the ratio is still lower.

Besides the attractive economy in safety regulation, the Board also considers another factor. In the case safety, the cost of the modification is negligible.

• **CAA.** Coach 256 Seats—One CAB official has specifically computed the maximum passenger load of most airlines' DC-4 seating density by comparison with United's new standard. Here it is: he does it (and he wants that that is a basic calculation) because of the boldness of United's change.

The airline's figures odds against a fatal accident on a 1,000 mi. flight (typical coast distance) average better than 100,000 to one. Against that 25% of the routes are the type on which one would not want to fly.

However, United's main competitor, American and TWA, use DC-6 and Constellation coaches, which are not only older than DC-4s, especially when it comes to interior and lighting, but also provide about the same seat availability as United's new DC-4 coach standard. The CAB official points out that United's one reason why CAB allowed a lower seat ratio on the DC-4 because it is obsolescent.

• **United Flies Higher—Going on from the safety-for-economy statistic, the CAB official takes up price regulation in assessing the practicality of any safety improvement.**

The increased seating density on most DC-4 coaches allows airlines to make standard profits at a seat-for-seat to one third reduction in fare (50% more passengers, 33% lower fare per passenger). When the passenger will be

given advantage of an good a price set, he may consider the crowding a benefit. At CAA Administrator Blatt figured that it is worth the risk.

Finally, the CAB official points out that the present coach推崇 could not yet be the right time to fly by as his vacation, he might not fly at all, and so that may be probably would drive his auto to some place nearer.

Since CAB required that DC-4 day coaches have seating capacity of 64 or more, Patterson's cutting his coach seating to 56 is probably his earnest intent for the coming year. Noting recently, Patterson is from the Board to not put much stock in that. United may have to file a higher rates for than can put him at a disadvantage, the CAB Rates Division believes.

Patterson, Horne Aircouch Telegrams

Following are texts of the telegram exchanges between President W. A. Patterson of United Air Lines and CAA Administrator Charles House on the recent seating regulations.

To Charles H. House,
Administrator of Civil Aeronautics.

We have just received the results of our tests on the evaluation of high-density as coach. The tests proved to us that the present seat in airplanes which has been our guide up to now is inadequate to give reasonable safety in case of fire or ditching.

For your information, we have, at this time, modified our DC-4 aircraft to a 256 passenger which eliminates the present seating. United seats will remain in the airplane until such time as they can be removed. In the interim, passengers will not be allowed to sit three abreast during loading and unloading.

We have made this policy decision with our policy. However, you must appreciate that it is easier to make in the press a statement than to make. If this request does come out unanticipated, we will be forced to make a statement.

"Our research indicates that, in the event of a crash or landing accident, high-density seating would cause greater recognition and therefore create a safety hazard. We have had a perfect safety record as far as aircraft operations and we wish to avoid anything which might constitute as available hazard to our passengers. Further studies on the subject of high-density seating are being conducted."

We hasten to make this decision because of our concern that it may prove publicistic with persons who may disagree with our interpretation of your administration's responsibilities of your administration. We researched that losses to the public are our last responsibility.

We could not with a clear conscience, in view of our findings, avoid conducting action

that has been done as quickly as possible to our best to help this company will set our. We will have to take a position of what carrier should be allowed to use our air space. What other airline has not been our influence on the decision. If you have any idea as to our position, we have observed to keep this secret on a constructive level, please write or phone your suggestion.

W. A. Patterson, President
United Air Lines

To W. A. Patterson, President
United Air Lines, Inc.

Your desire to reduce passenger rates by cutting the cost of operating aircraft, Patterson is from the Board to not put much stock in that. United may have to file a higher rates for than can put him at a disadvantage, the CAB Rates Division believes.

As you are aware, our regulations have incorporated with your Council tests which supplement and confirm other tests and studies previously made jointly by CAA, CAA and AFA. Council studies of new knowledge in winter change recommendations to CAA for new regulations. The best factor in both Council and previous studies appears to be that improved crew training is most reliable in reducing crash avoidance and that seat redesigns are not as important.

I would like to further information on your fare and request that you explain what role CAA people in Washington as soon as practicable in helping us in which our analysis of Council data caused aerial seat redesigns and that seat redesigns are not as important.

I urge that you make your decisions and



THROUGH THE CANOPY

A doorway, suspended in an open position, looks upward after being fired through the closed plastic canopy of a fighter plane during mock dogfight Navy tests. This shattered piece of white-painted canopy is in the air. When emergency canopy is shot, Navy is running tests to determine feasibility of human ejection through them at greater speeds.

your fare data available to all aircraft operators concerned at once, or enforce me to do so in accordance with standard CAA policy.

Charles E. Horne

CAA Reshuffles Its Development Setup

Washington observes last week saw the elevation of Civil Aeronautics Administrator's Office of Aviation Development (OAD) and the reorganization of its functions as a step in power personally for Joseph D. Blatt, much-revised assistant administrator for program coordination. Otherwise, it appeared to be more of a paper shuffling within the agency than anything else.

Under the new plan, the two former top posts in OAD now report to Blatt, who has general responsibility for development and training of aircraft, aircraft, maintenance, inspection and personnel flying and aviation education.

Wiley Wright, former director of Aviation Development, has been named director of General Aviation Staff.

• **Other Functions.** More—These other functions of OAD will go back where they came from at the time the newest CAA was established in 1948-1949 under former CAA Administrator D. W. Rutherford.

Flight information activities such as Airman's Guide, etc., go back to the Office of Aviation Information. Air Mailbag still headed by Bleeding Nose, goes back to Office of Federal Airway, and Link Training goes to Office of Aviation Safety (OAS). Technical evaluation advice on development problems is expected to be supplied to Blatt by the technical staff of OAS.

As the basis of the Rutherford now government, one regulation says, is the new CAA, which has a budget of \$700,000, congressional appropriation for civil and military aircraft development. For fiscal year 1952, just offset to expand CAA technical development in proposed places had received funds from the aircraft manufacturers. The attitude continued in spite of CAA's office of contracts to no systems which already had begun to suffer in the collapse of the postwar aircraft plane houses.

• **Eastern Left.** About the time OAD was established, most of the administrative functions in CAA were decentralized for the purpose of better and better flight. A. E. Wright left the agency. These included such men as John H. Geiss, previously responsible for the trend and

gram progress. W. L. Jack Nelson, first secretary of the Permanent Flying Development Advisory Committee, has informed Mr. Lloyd Child, and Dr. Ross Marshall, whom whom had been an important factor in releasing medical requirements for private pilot licenses.

Most credit to OMD during its short lifespan goes for its part in development of the GAA spinster AG-1 aircraft, an aircraft experimental plane designed by Prof. Fred E. Weist at Texas A&M College with industry cooperation, it was later built and flight-tested to agricultural operation areas around the country.

Features of the plane and its operating and landing systems are expected to appear in some forthcoming commercial production agricultural planes, but there has been no announcement of a plan to build a plane essentially similar to the AG-1 itself.

Prop Wash Causes Lightplane Crashes

(McGraw-Hill World News)

London—The Ministry of Civil Aviation claims that in the past two months it has received "several tons" of light aircraft losing control after passing into turbulence created by the propeller wash of large civil transports.

A case in point, MCAS's accident in reporting, says, occurred at London Airport Aug. 1. A 192-Hp Rapide biplane, operating pleasure flights for a London firm, was cleared to land behind a Stratocruiser. Approaching at 100 ft and 100 mph and starting a turn, the Rapide ran into severe turbulence and went out of control.

"In a rapid movement," the report says, "the aircraft was lifted to the right as on wave but it suddenly rolled several times." The pilot immediately raised engine power to regain control, but the aircraft was now thrown violently to the left, and on an even keel. It then started to lose height rapidly.

In the resulting crash, five of nine passengers were injured.

Referring to other similar crashes investigated subsequently, the report says, "Small aircraft have encountered turbulence of such a nature at altitudes exceeding one mile from other aircraft. It appears that in conditions of little or no wind the turbulence is likely to persist near the ground for an appreciable length of time."

All-Women Air Race

The All-Women Transoceanic Air Race will be held July 1-5 next year, starting at Lawrence, Mass., terminating at Long Beach, Calif.

Navy Confirms Aircraft Cutbacks

F9F-6, AD-5 and FJ-2 programs trimmed heavily under Defense prodding to phase out obsolescent types.

Navy last week confirmed Assistant Secy's previous plan of Nov. 26 on reducing production cutbacks in Navy contracts with Grumman Aircraft Engineering Corp., Douglas Aircraft Co., North American Aviation, Inc., and Naval Air Warfare Center. The cutbacks were made as a result of prodding by Defense Secretary Robert S. McNamara to phase out production of all surplus obsolescent military aircraft before the end of 1961.

Earlier, USAF had confirmed that in Lockheed Studios (P-94C) and Northrop (P-89) production programs also had been cut back as reported in *Aviation Week* (Nov. 24, p. 14 and Dec. 1, p. 7).

The Navy-suspended cutbacks are:

- **Grumman.** Production of the swing wing Cougar (F9F-6) is reduced by 35%. Senior vice president a thousand Cougar had been ordered, but that represents a heavy climb in Grumman's jet fighter plan. Only the F9F-6 program has been cut. This version is followed by an advanced version of the Pratt & Whitney J45 centrifugal flow turbojet.

- **North American.** Production of the T-28B (T-33) is reduced by 10%. A relatively small quantity of F9F-7s produced by an advanced version of the Allison J35 turbojet will be retained in the production program.

• **Douglas.** Production of the Skymaster AD-5 is reduced by 15%. This rather thin combat version of the Korean war has set a new standard of military performance. It is a fighter/ground-attack aircraft both in carrying a 6,400-lb bomb load than that the World War II load of 4,815-lb payload all cause decked in a double deck under excess fuel. Special version of the Skymaster equipped with radar and weather-reading gear will continue in fleet service long after the initial versions have been replaced by more modern fighter/ground-strike aircraft.

• **North American.** Production of the FJ-2 (F-11) has been reduced by 33%.

Aviation Week independently reported earlier that the North American cut would come in Super (AJ-1) production. The FJ-2 is the Navy's version of the USAF Sabre (F-86). First production version of the FJ-2 is scheduled to be delivered from North American's Edwards, Calif., plant in mid-December.

• **Douglas.** The cutbacks can start April 1, scheduled to be delayed during the last half of 1964 although a few earlier deliveries are slated.

All production work now in progress will be continued on these three types. Navy emphasized that the

cutbacks had been implemented because of a Defense Department's request to cut back contracts for production of aircraft that were facing a relatively short life as a first-line aircraft and that emphasis would be placed on bringing more modern types into production sooner.

Observers noted reluctance of the Navy to make the cuts since it will have to obtain fewer modern aircraft types than those originally scheduled because of the increased cost of the newer types. These cutbacks will also delay the four aircraft procurement programs because the newer types will be available later and at higher quantities.

Weight Limits Upped For Army Aircraft

• New inspection of engines cuts costs and time.

• Method proves successful at P&W and GE plants.

Weight limitations on Army helicopter have been lifted and the allowable empty weight of landing gear doubled, according to a new agreement between the Army and the Air Force.

The new agreement puts a limit of 5,000 lb empty weight on Army landing gear. It stipulates that the weight limitation will be reviewed annually by the Secretary of the Army or Secretary of the Air Force to keep the limitation "realistic."

Previous limitations were imposed by a joint Army-Air Force conference that restricted landing gear aircraft for the Army to 2,500 lb and helicopters to 4,000 lb. These limitations have been a source of criticism by Army aircraft maintenance officers. The new arrangement is considered a long step forward by Army aviation.

Model solution, they say, would be to make the limitation entirely out of function, without any specific weight limitation. That is the way that the new arrangement is set up in the next group of the new solution.

The intent is to make the use of compromises between Army and Air Force over the rules and types of aircraft that will be defined there Army as functions as a basis for procurement requirements.

- **Observation to locate, verify and evaluate targets, including limited aerial photography.**

- **Control of Army forces.**

- **Command, control and liaison stations in combat zone and in combat.**

- **Aerial war laying in the combat zone.**

- **Transporting supplies, equipment personnel and small units in the combat zone.**

- **Armed reconnaissance in the combat zone.**

- **Artillery and topographical surveys.**

- **Air Force will continue to provide their air fractions for Army.**

- **Aircraft of supplies, equipment personnel**

and units, from outside to within the combat zone.

- **Attack to evaluate personnel and materiel from the combat zone.**

- **Airline fuel storage, supplies and equipment in combat and subsequent airbase operations.**

- **Advertisement: extensions from the initial point of transport to hospital base to points outside the combat zone, and temporary extension of all combat base in airborne operations, until ground troops are attained.**

For use out of every two aircraft until 75 more engines have been born down and inspected.

As a result, since no major defect is found in this batch the rate is increased to use out of four engines until an additional 75 engines have been inspected. If this procedure no more than a single engine defect the inspection procedure continues at a rate of one in 15.

Whenever a serious defect is found in any given batch of engines before 75 engines have been born down, the inspection is referred to the next lower level.

In the New Mexico, this reduction is achieved in the duration of the resident plant inspection and depending on the type of defect discovered. In the Air Force plan the reduction is made daily. Total of 525 engines must be passed the statistical sampling method before the 1,000 of 10 inspection rate can be applied.

• **Reserve Plan:** is what the plan has accomplished so far.

- **Sees money:** New figures show that PWA has used an average of \$659 per engine on oil, fuel and labor alone under the new plan. Additional savings will come from the savings of the cost of parts damage during the test, down and inspection.

- **Speeds delivery:** Time saved by elimination of the green test can be savings about three hours per plane per day during the test, down and inspection.

- **Provides delivery:** Time saved by elimination of the green test can be savings about three hours per plane per day during the test, down and inspection.

- **Conserves test facilities:** Engine test facilities for jets, have been a bottleneck ever since the post-Korean production expansion began. Conserving of the green test can test cell time



UNDERNEATH THE STARFIRE

Lockheed F-9C Starfire with over an 40 per wing, providing a detailed plus view of its underside. Note the swept horizontal tail, fitted with leading edge slats looks like a P-51A, with afterburner providing about 9,000 lb thrust. The newest all-weather USAF interceptor

aircraft had been implemented because of a Defense Department's request to cut back contracts for production of aircraft that were facing a relatively short life as a first-line aircraft and that emphasis would be placed on bringing more modern types into production sooner.

and rates, from outside to within the combat zone.

- **Attack to evaluate personnel and materiel from the combat zone.**

- **Airline fuel storage, supplies and equipment in combat and subsequent airbase operations.**

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base to points outside the combat zone, and temporary extension of all combat base in airborne operations, until ground troops are attained.



NEW ITALIAN ADVANCED TRAINER

tailoff 40-45 ft for a top speed of approximately 500 mph. In flight duration 50-55 min. Construction is all metal. The large high-speed canopy provides good visibility. Variable leading edge slats can be fitted on the cowl.

continued for nine out of ten engines in half.

The statistical sampling program was originally applied by the Navy at P&WA in 1959 as an emergency measure to speed delivery on the J47 turbojet by using a production line cell technique. It worked out well enough to be used on J48s and J49s, and was extended to cover the J4850 and J48500 powerplants as the successor of J48s.

The J48 was included in the plan in June of 1953 and after it had passed through a period of component testing this engine reached the 1-in-10 inspection level in October.

The Air Force began using the plan at General Electric's West Lynn plant on the J47-35 and J47-37 last May and reached a rate of one in 10 in September.

The Navy also used the plan for its models with the Wright engine 34 subseries in the Kansas City plant but abandoned it because of production problems there.

Short Bros. Cites Need for Jet Orders

(McGraw-Hill World News)

London-The first English Electric Canberra jet bomber to be built by Short Bros. & Harland of Belfast has made its maiden flight. Short's chief exec., Capt. Alan M. S. Stanley, took the opportunity to make a complaint. Unlike most British aircraft manufacturers, he has labor, materials, and production capacity, but he needed more orders to fly.

The list of those would easily be the summer of 1954 and by the end of 1955 his plant would be in a position to turn out one a week if the orders were forthcoming.

So far only about 12 Series 2 Canberras have been ordered, and last week Sir Nevill's announcement that a new Cross-Channel airway line was being planned through Brighton, via Chichester, Hailsham's biggest production unit, now making Vickers, Harrow, Duxford, and Coast parts.

De Havilland is confident further orders for Comet 2s will be forthcoming and has asked for Comet 3s. Production of the last of 31 Series 1 Comets is almost in sight at the de Havilland production base in Hatfield, Herts.

With orders, Capt. Stanley thinks, "We can produce the aircraft in well and as quickly as the U.S. can, and at much less cost." Short Bros. is one of three companies subcontracting produc-

tion of the Canberra. A V Roe and Hawker-Peugeot have yet to announce their first production model. Stanley's remarks indicate that the Canberras ordered in the three subcontracting plants are small, perhaps in the neighborhood of 100 each.

Short Bros., according to Stanley, is one of the few British aircraft plants to be fully working and able to work day and night shifts. He figured most British aircraft factories worked only 8 to 10 hours a day.

Short also builds the S.4A-100 jet research bomber, the second model of which flew for the first time last June.

World Aircoach

- IATA conference plans global service by 1954.
- Europe-wide network to commence next April.

Worldwide aircoach service is expected to become a reality by April 1, 1954, as a result of agreements reached by member nations of the International Air Transport Assn. (IATA) at recent conferences in Cannes, France.

Approval of a network of air transport services throughout Europe, expected to go into operation next April 1, will be the first big preliminary step toward globe-girding aircoach services.

Deutsche Lufthansa, conference chairman, told a recent press conference that "aircoach" means an economic resolution "as far as possible" and added that for the time the network must have become fully operational. "The major portion of international air passenger traffic will be carried on normal routes, such as first-class flights, but the economic basis of the network will be made within these defined transports."

► Calendar-The 67 member nations have about 50 countries which now pay the IATA Traffic Conference code policy on questions of international fares, rates and other tariff matters in aircoach countries which are subject to approval of their respective governments.

The calendar of aircoach extension decided on by the conference:

* Apr. 1, 1953. Tenth member to be invited Europe and the Middle East-Austria, Brazil, Czechoslovakia, France, Germany, Israel, Iran and Yugoslavia.

* Oct. 1, 1953. The network will extend from the Middle East to India, Pakistan and Ceylon, and from Europe and the Middle East to South Africa.

* Apr. 1, 1954. Australia will join Hong Kong, Manila, Tokyo, Australia and across the Pacific to South America, San Francisco and Vancouver.

to link up with Western Hemisphere networks and trans-Atlantic routes.

It is expected that when the program becomes a reality, about half of the international passenger load of 2,500 planes will be converted to high-density aircoach seating.

Fares will vary from route to route but it is expected that coach rates will be about 20 to 25% less than first class. Premiums, first and first-class fares in the Western Hemisphere and over the Atlantic are expected to remain about the same. A third class, called "Class B," is expected to be about 10% below tourist rates and is planned for the Far East, the Middle East and the West African routes.

There will be no appreciable change in cargo rates throughout the period of this agreement, but plane or marine cargo tonnage across the Atlantic will be discussed at a special meeting of IATA in February. The next world conference will be held in November 1953.

New South Africa Services Sought

(McGraw-Hill World News)

Johannesburg—A number of new services are starting to crack the passenger and freight market held by British Overseas Airways Corp. and South African Airways on the Johannesburg-Paris run.

Recent applications have been made to the Central African Air Authority by several independent carriers who claim they will not present bids by April 15.

First new operator to get a license is El Alim Air Transport Co., London, now operating to Nairobi. Anewak Ltd. has applied for a London-Saburbia route using Vickers Viking and Hawker-Peugeot transports. Skymar Ltd. is asking an aircoach route by way of Mombasa, Nairobi, Khartoum, Wadi Halfa, Cyprus and Malta to London. Tropic Airways is applying for a service from Durban via Port Elizabeth and Saldanha along Africa's southern coastline.

Jets for Cotton?

(McGraw-Hill World News)

Rio de Janeiro—A deal already being worked out between Brazil and the U.S. will see 75 Convair 340s delivered to the Brazilian air force. The aircraft will be used to fly from the Middle East to India, Pakistan and Ceylon, and from Europe and the Middle East to South Africa.

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PRODUCTION ENGINEERING



FLAREOUT Landing of production HTK-1 during flight test shows a Kaman Navy cockpit's nose profile. The code resulted out of the Kaman Aircraft Corp. K-225 civilian helicopter.



NAVY SERVICE On the left, two production HTK-1s after flight tests at Kaman's Winter Haven plant. One engine is undergoing suitability tests by Army Ground Forces at Ft. Bragg.

Kaman HTK-1 Copters Roll Out for Navy

Kaman's 3.3 place HTK-1, probably the world's only all-weather type helicopter in full production, is moving through the firm's Winter Haven, Fla., plant as an assembly-line basis. Deliveries are being made to the Navy and Marine, and one of the copters is undergoing suitability tests by the Army Ground Forces at Ft. Bragg, N.C.

Basically a training craft, the HTK-1 can only be adopted to medical evacuation status—the left half of the canopy swings outward to facilitate loading of litter.

The HTK started out as a military version of the Kaman K-225 civilian copter, but finally evolved into an origi-

nally new design, in which the intermeshing rotor and Kaman servo-link control system were retained.

• **Design Changes.** Several major modifications set the production HTK-1 apart from the prototype HTK which made its debut at the Eidgenössische Forum in April 1961.

Changes include decreased tailboom width, a new rear end, and strengthened changes in the joint blades. Shortening the tailboom caused a lot of tail boom movement time; so the size of the outboard fin was increased from 109 sq. ft. to 221 sq. ft., and vertical and dorsal fins, each of 16 sq. ft., were added on the tailboom.

The tailboom blades are actuated by the servo links, a distinctive Kaman feature.

The HTK-1 recently received CAA approved type certificate 1BB (Navy, in its contract award to Kaman, specified a craft so designed and constructed as to be certifiable). Commercial designation of the new helicopter will be K-210.

At present, Kaman has slightly over

100 aircraft with a pair of K-225 motor blades, which have equal chord throughout. But the production HTK-1 has newly designed blades that are narrower than the old blades, widening at the midsection, and tapering toward the tip.

The smaller blades are actuated by the servo links, a distinctive Kaman feature.

The HTK-1 recently received CAA approved type certificate 1BB (Navy, in its contract award to Kaman, specified a craft so designed and constructed as to be certifiable). Commercial designation of the new helicopter will be K-210.

At present, Kaman has slightly over



1 HTK-1 fuselage starts with small subassemblies which are put on the main jig (left), and welded to form main frame (right).



2 Engine, transmission, controls, and electrical and instrument bays are outlined. Shroud means of landing gear are inflated.



3 The tailboom is made here. The boom is assembled, as is the horizontal stabilizer and part of the vertical and dorsal fins.



4 Cyclic link bushings and the tailboom, with its motors attached, are added. The engine is then checked for an hour.



5 Blade installation moves outdoors on calm days. After flight test, craft gets Navy paint job. To get copter into paint shop, workers must be lowered. They are lowered, for safety, to some half they were attached to during flight test.

this is of vital interest to everyone who has a **VIBRATION PROBLEM!**

Here is a fresh approach to vibration and shock control—an all-metal aircraft mount! Just look at the careful fabrication of the stainless steel wire encasing. This is the heart of the new Robinson Met-L-Flex mount. Shock and vibration are reduced from every angle, thereby isolating and protecting the mounted equipment.

With Range of Applications
Robinson Met-L-Flex design control can be applied to the mountings for aircraft, ground equipment or heavy machinery.

For better vibration control, has been specially tested to keep pace with modern advances in the design and use of electronic and precision equipment. Why, here's it!

Great Last Service

Where the new principle of all metal vibration control is used with Robinson Met-L-Flex mounts or engineered mounting systems, it offers decided economy. It not only permits simplified design and construction of equipment, but also contributes to longer useful life.

Outstanding Performance

Robinson Met-L-Flex mounts were originally developed to meet unprecedented, severe conditions of modern high speed planes.

From take-off to landing a plane's vital equipment is subject to the combined violence of shock and vibration. Here preference is needed. Met-L-Flex meets such challenges with flying colors, to the great relief of engineers. Moreover, unlike old-fashioned rubber mountings, Robinson Met-L-Flex mounts perform at peak efficiency under any atmospheric condition. They are not destroyed by oil, temperature extremes, or moisture—and the cost for replacement due to fatigue is virtually nil.

Proven and Accepted

Robinson mounts have been tested and accepted by more than three hundred electronics, aircraft and industrial manufacturers. With such a background and record of performance, Robinson offers the advice and counsel of its engineers toward finding the best and most economical answer for every problem of vibration and shock.

JUST WRITE AND ASK US

If you are an engineer, architect or manufacturer who would be interested in having more information as to how this new kind of engineered vibration control might help your special problem, we will be glad to hear from you. Drop us a line.

PRODUCTION HTK-1 model
here shown vibration and shock test. Newly designed rotor blades shown. Known service record.



PROTOTYPE HTK-1 helicopter in military version of model HTK-221 cockpit, but mounted on production as an entirely new design.

900 employees. Production lines are located in the former National Guard Hangar at Bradley Field, KAC occupies 32 buildings—20 at Bradley and two at nearby Somersby Airport—with a total area of more than 114,000 sq. ft. A new 104,000-sq. ft. plant, on an 85-acre triangular site at Bloomfield, Conn., should be in full operation by May 1955.

The new plant has been especially designed for helicopter construction, and Koenig expects it will permit a more efficient operation than is possible in the present workshop arrangement at Bradley. The site is situated between two eight-story apartment one of 5,100 ft., and a ninth-story strip of 3,700 ft.

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For further information, call your nearest Westinghouse Office or write Westinghouse Electric Corporation, Aircraft Department, Lancaster, Ohio.

13088



CAFORNIA'S LATEST is the little F-5 jet trainer, built of wood and powered by a Tadoussac F60 engine. This aspect of the plane emphasizes the large nose of Perpetrator of the cockpit, and shows off the jet in flight.

Italian Jet Plane Aims at Economy

Lots in lightweight jet trainers in the U.S. a plywood, low-wing aircraft developed by the Italair firm of Aeronautica Tazio.

ACT designed and built the two-place training version for use over and above pilot training, testing of a plane that would be economical to build and operate. That general consideration led to a lot of conventional aircraft geometry, a great Tazio. Other parts, least engine and all wood construction. ▶ Structural Details—The wing is built around a one piece box spar with laminated Douglas fir webs and hard plywood webs. Covers are plywood.

The forward support for the leading gear leg is an auxiliary wing spar, that member also serves to load the wing into the fuselage.



Flaps and ailerons are carried on a rear fuselage. Flaps are operated by hydraulic hand pump.

The fuselage is divided into two sections. Forward, containing cockpit, operating gear and nosewheel, in integral with the wing root, with jet pipe attachment and tail assembly. Both feature these surfaces together.

The fuselage is built up in single and two formers covered with balsa plywood.

Wall surfaces are similar to the main construction details. Fix and similar fairing part of the fuselage and are covered with birch plywood. Radiator and cowl are fabric covered.

▶ Landing Gear—Main landing gear of the fuselage undercarriage is lowered to the auxiliary wing spar and retracts into the wing. Nose wheel leg uses a longitudinal shock absorber; it retracts back into the fuselage. Part of the nose wheel remains outside the fuselage fairing, so that it is wheel up. Landing gear and jet pipe are protected. Retraction of the gear is mechanical.

An air intake operates with a low pressure system, is fitted to the fuselage belly. It removes the overall drag without much change in pitching moment.

Noteworthy feature of the cockpit design is the large amount of Perpetrator range man provided. Visibility should be excellent from either seat. The canopy can be ejected in flight, in the event of trouble.

The forward position is for the student, and contains all the necessary instruments for flight and operation of the aircraft. The rear position, for the instructor, has only three instruments, the instructor can peer over the instructor's shoulder to see the rest of the instruments.

▶ Installations—There are two fuel tanks, one of greater for engine starting and use for leisure. The greater tank is located outside the fuselage and holds

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BOURNS precision wire-wound potentiometers accurately measure mechanical position into an electrical signal. Resolution of .001 inch attainable on all standard ranges from 1 to 6 inches.

Technical publications describing standard models and special applications available upon request.

BOURNS designs and manufactures other potentiometer instruments which measure such physical variables as gage pressure, differential pressure, altitude and acceleration.



BOURNS LABORATORIES

6025 MAGNOLIA AVENUE • RIVERSIDE, CALIFORNIA

only 1.3 gal), the benzene tank holds 35.6 gal and is located on the airplane CG, just behind the second seat.

It is possible to increase the fuel capacity by using replaceable tanks internally in the wings or with auxiliary wingtip tanks. An alternate tank can be carried in place of the outboard fuel tank for long-range flight training flights.

For short flights, two systems are designed for aircraft flying.

The electrical system is 24-volt, battery-supplied. An electric trailer is supplied for starting the jet engine.

Robin is a V-1250 transmagnetic-rotor fine snapshooting system is enclosed, operated by the first pilot.

The Turbokarrier Puma has a static thrust of 330 lb. It is located behind the wing in the rear fuselage belly. Jet exhaust is directed straight out, firewall insulation is done with glass wool. ► Performance—Maximum speed of the P-5 at sea level is 374 mph, and at altitude 362 mph. Climbs to 16,000 ft in 21.5 sec.

Takes off run with flaps is 970 ft, without flaps is 1,360 ft. Landing run with flaps and flaps up 900 ft, without flaps only 795 ft.

Actual ceiling of the craft is 26,300 ft.

Wingspan of the P-5 is 25.8 ft; overall length, is 21.5 ft. Gross weight is 1,010 lb, and weight empty is 1,012 lb.

With a wing area of 167 sq. ft, the wing loading is about 15 ps. Fuel consumption is about 25 gph.

Scale-Model Tunnel Blows Big Wind

A scale model of the giant propulsion wind tunnel being constructed at the Arnold Engineering Development Center, Tullahoma, Tenn., has been completed.

Presented in December 1957 by Arnold, operating contractor of AEDC, the model's function was designed, fabricated and operated on schedule.

Use of the tunnel will be in research on problems associated with the expansion of the big burner. It will try out ideas for improvement and modification, and will test installations proposed for the big tunnel.

Power comes from a 3,000-hp electric motor which drives an air compressor rated at 100,000 cfm. A portion of the air is circulated through the compressor section; it is admitted to the tunnel. This causes the operating temperature of the tunnel to be high enough that condensation will not occur in the test section.

Test sections 11 in. from square, test nozzle area is 10 in. in diameter, over 1,200 sq. in.

This scale-size tunnel is not a test

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Metallurgy

for
JET, PISTON AND ROCKET
ENGINES



Metallurgy

Ryan's Metal Products Division has taken the lead in solving one of the toughest problems facing the aircraft industry—that of finding high-temperature compositions that will better stand up to the intense heat developed in modern jet, piston and rocket engines. To do that, Ryan has assembled a staff of highly skilled, experienced metallurgical and ceramic engineers... and developed a physical plant equipped with some of the largest and finest high-pressure melting tools in the industry.

Manufacturing components for the "hot spots" in present day piston engines requires the best equipment and most modern methods of forming, welding, processes, annealing and heat-treating. And that's exactly what Ryan's Metal Products Division does through "research, development, and extensive field testing experience, it can furnish the industry.

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RYAN AERONAUTICAL COMPANY • LINDBERGH FIELD • SAN DIEGO, CALIF.

Valve Talk

for WM. H. WHITTAKER CO., LTD.
by Marvin Miles,
Senior Member, Aviation Writers Assn.



Stop and consider the problems you would face without the variety of valves, controls and the remote control systems offered by today's \$200,000,000-a-year aircraft valve industry.

Foresight and ingenuity have made the valve business a vital component of aircraft production.

Many firms have tried and failed to produce valves, failing primarily because they underestimated the design and production skills necessary. They simply couldn't meet the increasingly high demands of aeroengines and engine manufacturers—greater performance... reduced weight... smaller envelope...

But certain concerns could answer the demand, if the less weight and cost factors could be met and they also had the ability to produce valves to exacting standards. They have become the established leaders in the valve business.

These are the companies that are so thoroughly mentioned in any talk with Whittaker people. Together with Whittaker, they have a wide valve line for aircraft, ship, railroad, industrial, chemical and electronic applications—standards that are appreciated by customers both here and abroad.

Their continuing distinguishable reputation in the production of valves and ability to create special items cannot be all—they have also delivered deeply into specialized fields, varying with each firm, so that between them, they meet the widest possible range of demand. And they meet it with the constant quality control, research and development that flourishes in know how and specialization.

Internally, competition between them is sharp. Whether senior management or salesmen are responsible in most cases, either, recognizes their merits and acknowledges their role in advancing the industry.

Take Whittaker—one of the pioneers in the field. Developers of the first hot air valves, manufacturers of all types of valve equipment for cabin pressurization, aircraft fuel systems, and highly regarded production methods and quality work—"Tough competition," Whittaker men will tell you.

Or Parker—another pioneer. For red using the leader in the development of synthetic rubber, no one can claim to be a leader in a big part in the valve business. Whittaker knows as far as fuel selector and check valves, as well as for its single-

and two 100-lb pressure valves, up to 160° deg. sat., and valves are 500 lb. max.

Whittaker's address is 2222 S. Halsted St., Chicago 8, Ill.

New De-icing Setup For 'Ice Wagon'

Ice formation will energize the de-icing equipment soon to be installed on the "Rockwell Ice Wagon," Ga. radiator icing research aircraft. Until now, deicing equipment has been operated by a heating device rather than by actual spraying of ice.

The "Ice Wagon" the new equipment was developed by Goodyear National Aeronautical Development, design and engineering were done by Goodyear, Inc. & Rockwell Co.

The new deicing probe will be installed on wings, tail, and stabilizer leading edges of the Ice Wagon, to complement the Goodyear installation already on the propellers and leading dorsal fin.

The plane is the fourth to use the NACA's probe, earlier versions having suffered their usefulness. The purpose is to fly data runs of icing to determine the accuracy and the complete method of removal. Research organizations travel on the flights and seek out problems at this crucial, instead of waiting for the ice to return with them.

The Ice Wagon is a modified Douglas DC-4A, built under license by Canadian, Ltd., Montreal.

Battelle Building German Center

Metallurgical and engineering research to help better Europe's economy will be one of the prime purposes of the new Battelle Material Institute for Germany, scheduled to be opened in late spring, 1953.

The new facility is being built at Frankfurt am Main on a site permitted by that city. One million dollars will be invested in the buildings and an additional half-million will be used for equipment.

Battelle is also establishing a research center at Cetona, Switzerland, and has set up a group of laboratories for industrial research in connection of Switzerland and Germany, Director Clyde Williams says.

Battelle capital will be provided by Battelle Operational funds as to be provided by European industries and governments and American relatives in Europe. Most of the personnel will be European, with Americans used for administration and liaison. Labs will be staffed with European scientists and technicians.

And there are many others... These are the companies that have helped build the aircraft valve business into the solid, recognized industry it is today. And, as you can see from their products are top.

The Whittaker Company respects its competitors.

AVIATION WEEK December 8, 1952

RADIOGRAPHY MAKES SURE

this
jack base
can
shoulder
a big job



Hydraulic jack base in test.

Hydraulic jacks are born to lift loads many times their own weight and size—to stand internal pressures of thousands of pounds per square inch.

This takes sound castings—soundness which only radiography can prove without damage to the part. And the diagram, knowing the casting will be sound, can count on strength without excessive weight.

Instances like this show why more and more

foundries are making radiography routine. It is the way to be sure only high-quality castings are released.

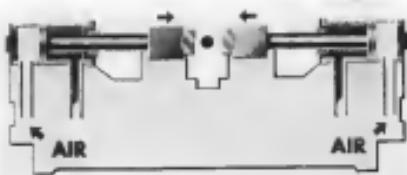
If you would like to know how radiography can improve your plant operation, talk it over with your x-ray dealer. And, if you wish, we'll send you a free copy of "Radiography As A Foundry Tool."

EASTMAN KODAK COMPANY
X-ray Division, Rochester 4, New York

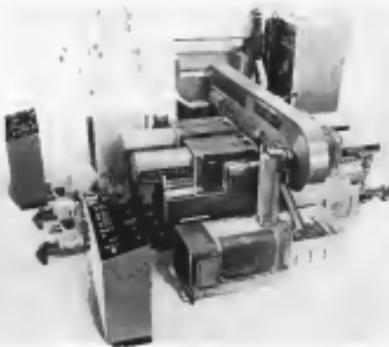
Radiography...

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CHAMBERBURG IMPACTOR® applies principle of complete absorption of energy when two equal, radially moving砧块 (blanks) impact at equal speeds. In the impactor, the terms complete absorption of the impeller's energy for deformation of the stock.



AUTOMATIC SET-UP for two Impactor units producing jet blades. Blanks are held in a砧块 holder (upper left corner). 1,砧块 is fed to the impactor; 2, heated stock is clamped into upper砧块 (underneath砧块 support); 3,砧块 to transfer device for holding the work; 4, first Impactor for rough forging; 5, second Impactor for finish forging; 6, forged billeted from work; 7, discharge chute; 8, control for inhibited Impactors; 9, control for complete process.

Parts Forged by Collision Hammer

By Irving Stone

A new type of hammer tool that forging metal at random by impacting in the approach for forming metals that has been worked out by Chamberburg Engineering Co. Stock is fed through a series of dies that collide against the work, without rebound, to form the part.

The new tool is known as the Chamberburg Impactor and action can be both static or semi-dynamic. Advantages of the technique are reported to in-

clude fast processing, longer life, decreased energy input, improved metal working and lack of vibration.

While the company now stresses the tool's forging potential, other applications, such as stretching, upsetting or the continuous development of the process.

Already in use—Two of the machines already are in operation, one in aircraft engine work at Thompson Products, Inc., Cleveland. Here the Impactor cold-cuts jet engine blades under an Air Force experimental con-

tact. This machine (a No. 6, delivering a 6,000-lb. lb. blow) utilizes a magnetic holder for positioning the blades.

The second machine (the a No. 6) is being used by International Silver Co. for cold-forging stainless steel hollow tubes for aircraft. Metal with a production rate of 30 per minute.

►Parker's Will Go—Other customers are scheduled to go into operation before the end of the year.

Parkard Motor Car Co. will soon put the first of four similar units into being back for automatic precision forging of blades for General Electric Co.'s J47 Chamberburg says that production rates will be 4 to 6 times that of present methods, depending on sort of the work. The Parkard machines, including two No. 6 Impactors, will be fitted with necessary hoppers, tools, conveyor, etc. Equipment will include automatic heating facilities (Oven Craft Corp.), automatic controls (Loch-Nordson Co.) and bending elements (Westing Co.).

Parkard also has ordered an installation employing two 15,000-lb. lb. Impactors in the striking units to forge turbine buckets.

►Other Customers—Two No. 6 units will go to General Motors Corp.'s Oldsmobile division for impacting rough blades for the 305 Super. The machine is now in its final test stages and will be completed at Oldsmobile with automatic heating and bending equipment built by Industrial Heating Corp. of America. Production rates for this machine will be comparable to that of the Parkard unit.

Under study for application at Curtis-Wright Corp.'s Cicero plant is another Impactor—a No. 4 unit.

A machine with two No. 4 units is scheduled for Ultra Drop Forge & Tool Corp. Initially the installation will be full manual while die development is proved out. An automatic heating cycle, arranged at Chamberburg, is planned for the machine.

►Theory of Action—Principle of Chamberburg's new tool is a simple one based on a law of physics that has been demonstrated to many a classroom—when two metallic bodies of equal mass travel toward each other at the same speed and collide, both bodies come to rest with a complete absorption of energy.

This principle is mechanically translated in the machine by two opposing anvils—anvils—moving in a horizontal plane and carrying dies at their extremes. Impeller activation is by compressed air in opposed cylinders. Stock is positioned at the impact plane, the two dies close against the material, and the resulting deformation absorbs the impeller energy.

When two operations are required, such as blocking and finishing, two Impactors are installed, one after the



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Tough, lightweight EN58008 strength profiles are precision made to meet rigid government standards. Richardson's production skill and years of experience give added assurance of top-quality dependability.



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Write for Bulletin



other for the successive steps. Again, it would also be feasible to have blocking and freezing suggestions for a single set of dies, with the steel being fed the substitute blocks in the one sequence, as is now done in the final installations.

Advantages.—As a result of the almost complete absorption of energy by the fraying and the repellent, there is no shock or vibration—neither in the machine, nor in the floor. Chauhanbhai says that the impinger can be located directly in production lines, since they are on upper floors, and adjacent to assembly or delicate equipment.

• Material is washed equally from both

side instead of from one face. This gives a more uniform working of the metal. In addition, metal travel is less, so that in forging a sphere to a shot, 25% less energy is required than with a conventional hammer.

- Stock and the metal in contact each other need a longer time. This results in the contact relations to later open fire, the temperature, hence longer the cycle.
- Stock can be heated faster because of heat emission involved. This is an appreciable increase in temperature of the stock, because energy of the impact is almost completely absorbed. This leads to shorter time to process through

magazine stations without rearming, and working with loose metal parts.

Control. Features—Ingersoll magazine is electronically controlled. Plane of impact is kept on center as a sensitive computer with sensing heads to detect blow intensity. Rough adjustment of magazine blow intensity is made by a dial. Fine adjustment is made by varying base of valve opening. Both blow intensity and rate of blow, may be preset, to match operations such as the spinning and automatic stock handling.

A blow will not start if the stock, not properly positioned in the plane of control, and it is possible to fit a blow to a specific operation.



SEWING NOT SEAMS THAT ADD MILES

... the PASTUSINI

Modern, precision methods used by Pestelot Armenti to produce aircraft components make possible lighter, stronger, pitotizable fuel tanks to increase range and combat effectiveness of American's fighter aircraft.

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AIRFRAMES • TIRE ASSEMBLIES • BOMB BAY DOORS

Fastener Problem of the Month

VIBRATION PROOF ELECTRIC TERMINALS

DECEMBER, 1952

PROBLEM: Severe vibration acting upon standard nuts used on electric terminals too frequently results in loose connections. Double nuts are difficult to adjust correctly and lock washers can tear soft brass connections. Yet the increasing use of electronically powered components and increasing power loads make accurate terminal fastening imperative on modern military and commercial aircraft.



SOLUTION: Positive protection against the loosening effects of vibration is provided by self-locking Brass Elastic Stop Nuts. The self-locking collar provides a constant and positive grip on terminal studs—ensuring continuous performance even during vibration by preventing vibration or power supply failures. Brassite Elastic Stop Nuts lock in any position on the stud, whether finely seated or not, they are easily adjusted. They are readily removed and can be reused.



YOU may have a similar fastening problem—or a very different one. In any case, you'll find ESNA engineers ready and able to supply a solution. Mail our coupon now, for complete information.



Dept. W-10-1955
Elastic Stop Nut Corporation of America
2200 Westland Road, Detroit, Mich.

Please send me the following free technical information:
 Elastic Stop Nut Bulletin
 Name in dictionary of my product. What features do you suggest?
 An ESNA Comparison Chart

Name _____ Title _____
 Firm _____
 Street _____
 City _____ Date _____ 19____

the machine with a control to accept work which is not at the proper fast position.

It is preferable to enclose the arms and introduce an appropriate strain device, if desired, since the fraying is handled and visual, so much.

► **See Research:** Range of economic power use in the machine is from 100 to 1,000 hp, about 60% of that value, Chubbsburg says. Ratings are by number representing maximum energy in thousands of foot pounds per blow. Frequency varies on units ranging from 1 to 400 in vibration increments already being contemplated.

Research and development on the process is still being conducted to determine full potential. Processing includes planes of die design, plastic flow and related solvents.

Supplementing Chubbsburg's staff are about 200,000 sq ft of research space being set up at Penn State's Engineering Experiment Station.

PRODUCTION BRIEFING

► **Liaison Engineering Co., Chicago:** maker of fast track fixtures, has purchased 45 acres of land in Los Angeles for construction of a plant and office.

► **Majorie Aircraft Corp., Memphis, Tenn.:** has taken over additional space in adjoining buildings and expanded manufacture from sheet metal products to special aircraft.

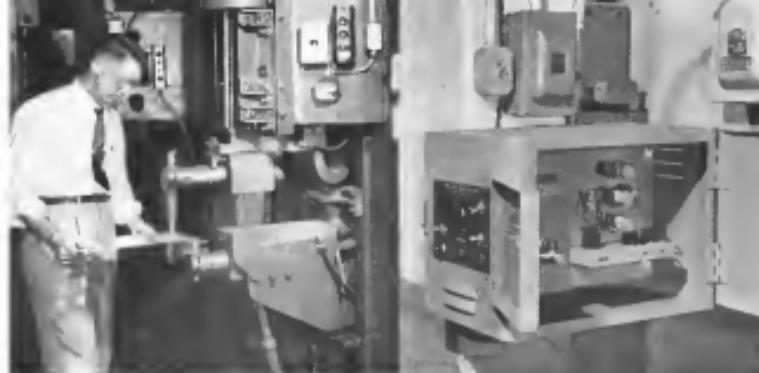
► **Link Aviation, Inc., Binghamton, N. Y.:** has subcontracted part of its C-11B jet flight trainer contract to Werhler Co., Tonawanda, N. Y. The C-11A trainer is being used to conduct pilot training in Korea.

► **Northrop Aircraft, Inc., Hawthorne, Calif.:** has granted an exclusive license to Nierco Sales and Casting Co., Costa Mesa, Calif., to manufacture and market a metalizing adhesive for bonding Hawthorne Systems.

► **Sequoia Aeronautics, Inc., Tarrytown, N. Y.:** has commenced construction on a new plant in Virginia, Va., to produce manufacture of aircraft structures and mechanical equipment.

► **The University of Wichita, Wichita, Kan.:** has started construction of a new engineering building having 25,000 sq ft of floor space which is scheduled for completion in time for fall classes in 1953.

► **North American Aviation, Inc., Los Angeles:** has leased a new 134,000 sq ft building in East Los Angeles near



Laboratory Tests Prove Resistance Welding Aluminum Is Easier with . . .

NEW G-E UP-DOWN SLOPE CONTROL

WITHOUT SLOPE CONTROL WITH SLOPE CONTROL



ELECTRODE FLAT is uniform surface on this electrode, and it is used without Slope Control.



LONGUE ELECTRODE UPS incline is used on this electrode with Slope Control. Above used on the same 1700 watts—no sloping.



SEVERE BURNING caused by severe slope in welding the same weld without Slope Control.



NO BURNING when G-E Slope Control automatically controls heat input in arc welding aluminum.



DUCTILE WELDS, such as this aluminum alloy 6061, show no results because of the tempering effect of gradually decreasing heat input. This means fewer rejects.

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GENERAL  ELECTRIC

49 Superduty 1/2" Models—8 speeds, 1000 to 2000 F.P.M. Choice of pistol or lever type grip.

2 Superduty 1/2" Models—400 to 1000 F.P.M.
2 Superduty 3/8" Models—200 to 1000 F.P.M.

One or more of these PET Superduty Models will EXACTLY meet any drill user's needs!



Why the complete PET Superduty line offers you the right drill for **YOUR** job!

Any establishment or production man will agree that the right drill for the right job means many savings. Better work, greater efficiency and longer drill life. So why compromise on a drill that's "almost" right?

PET Superduty Drills are available in 34 segments and choices include... the various speeds and rated power have been carefully selected on the basis of what industrial users have wanted and asked for. Result? You get a wide selection... and end up getting the drill that's exactly right for your work.

And, a wide selection isn't the only thing you'll like about the PET Superduty line. Just play in one of these drills: feel the vibration-free power as it flows from

a dynamically-balanced armature through a precision-ground gear. Then you will know you've found a drill that will stand up to rugged service, day in and day out—and will come back for more!

For complete details on the best in electric drills—sold at prices that will come as a pleasant surprise—find out more of your nearest PET Distributor. Write today to: Portable Electric Tools, Inc., Dept. AW 122, 311 West Elgin St., Chicago 20, Ill.

Be sure to ask for this free catalog!

Compare these quality with the power tools you've heard of, or seen. To find out more about the PET Superduty line, just drop us a card. We'll send you a copy of our catalog free.



The features you want are the features you get in PET Superduty Drills:

- **Greater Power for the heaviest job**
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- **Practically-Gearless Drives** (except for smooth, quiet power from
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- **Aluminum Alloy Die Castings** for light weight, easy handling
- **Can point Design makes handles reach drilling jobs easier and faster**
- **Most U. S. Government and Military Specifications**



PORTABLE ELECTRIC TOOLS, INC.

320 West 33rd Street, Chicago 20, Illinois
In Canada: Portable Electric Tools Ltd., Toronto, Ontario

and clear) showing he believed he was in the vicinity of La Habra and was trying difficultly with his ADF equipment to reconstitute status and that he would have to make more other type of approach. The Approach Control tower at N44C, the 4th tower, ILS approach and whether he believed he could pick up the outer marker satisfactorily. The pilot answered in the affirmative and further stated that he could probably find the ILS Glides Path and proceed to the tower on N44C and then descend (N44B) to a straight-in ILS approach from Los Angeles Center. Miller and given the current Los Angeles weather and also advised that the Los Angeles ILS Range was inoperative around being checked. Range was inoperative for approximately 10 minutes starting at N44C's approach within the next few minutes as the Standardized Radar Scope on the normal setting of 28 nm range in the flight control tower was moved toward the Los Angeles Center tower at N44C. When the range was moved to the Standardized Radar by 0011 around which calls were directed to N44C by Los Angeles Approach Control. No response was received.

At about 0018 the morning of April 19, Mr. Charles Jones, a member of the Los Angeles Fire Department, was about 100' west of Whisman and 221st and was a member of the Los Angeles International Airport. INVESTIGATION

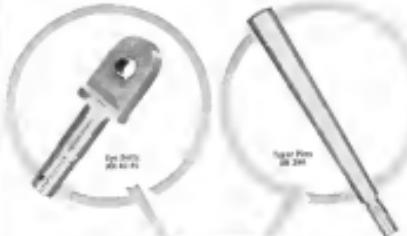
The accident occurred near the 100' of gauge (and at a distance of 100' from N44C). The aircraft was broken cleanly in the left, probably longitudinal, and on a heading of 260° magnetic. This was approximately 2,050 ft. south of the center line of the ILS approach path to Los Angeles International Airport, slightly west of south of La Habra, and about 72 nm east of the airport.

Erskine indicated that the power plants was operating normally and that both were developing acceptable power at rated output. Following first contact, the aircraft continued airborne for a distance of 1,575 feet across a review, when it descended and turned on the engine of the approach side.

Examination of the wreckage revealed that at initial impact with the ground the lead wing gear was in the extended position and the main gear was partially retracted. No evidence was found that any part of the aircraft had suffered any damage or dislocation before or immediately after the accident, and power plants in all of the three components had survived intact. The main gear assembly was found to be completely disassembled and was in an assembly condition when it cracked.

Damage to the cockpit section was as follows: that no visible damage could be made out of the instrument or control settings. The main gear shock strut had a crack in the outer case which was cut at 25.55. Examination of the shock strut disclosed that although the heat band was loose on the shock, the main load was laid at approximately 15.45 and the second band at 45.

The lead weight and balance weight of the aircraft was the one and a half at Kuala Lumpur, which adopted a gross weight of 64,932



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3, including 1,815 gal of fuel. This was within the allowable gross of 41,000 lb. It was impossible to locate a manifled set of Phoenix, a copy of which should have been mailed to the company's headquarters in Indianapolis, Indiana, by the CAA at that time. At 0606, 600 ft. of fuel and 12 qt. of oil were added. Using the long weights out of Kansas City and estimating 150 gal per hour fuel consumption (assumedly fuel for C-46 flight planning purposes) with 27 gal per stop allowed for training and warm up, the aircraft would have had 100 gal of fuel left. Phoenix with a gross weight of 40,512 lb., including 775 gal of fuel, at the time of the accident approximately 422 gal of fuel remained.

Nearly all of the radio equipment was destroyed by the impact with the ground. It was later learned that the ILS Control Head was positioned to Channel 11, corresponding to the Los Angeles ILS frequencies, and that the ADP was tuned to approximately 368 kc. The Los Angeles ILS outer marker operates on a frequency of 368 kc. According to company maintenance records, the ILS Control Head had been overhauled, establishing 2,000 hours since first. It was then certified on this aircraft May 23, 1951. The ADP was allegedly unoperational Aug. 3, 1951.

All radio contacts with the flight were normal, but at 0115 fueling reported as, "over four and clear." The last entry captured by the flight crew was the difficulty with the ADP component because of static. The Aviation Flight Inspection Branch of CAA on Aug. 16, made a second check of the aircraft and found no fueling errors, and the LA Helops checked the landing system. The report on this check indicated that operation of these facilities was normal in all respects.

Information given the crew of Phoenix showed clear weather for the remainder of the flight. The weather was described as moderate to poor in the immediate vicinity of Los Angeles where Edwards was known to be enroute with leg one and the Los Angeles Airport 500 ft. and 2 mi. with leg and base of the base of the flight's anticipated arrival time.

During the leg of the flight, Phoenix was in a tailwind that blew air and excellent flying conditions existed as far as Pomona, Calif. At the time of the accident the weather at Los Angeles Airport was reported to have been visibility 700 ft., overcast clouds 21 mi. with base and under 100 ft. Wind was 10-15 mph, an observed visibility 2 mi. with fog. The clouds and fog had been spreading rapidly and at the base of the accident apparently masked the ridge of Whittier and Pomona, and the adjacent hills. The top of the ridge and parts of the clouds were in the fog at the time of the accident; however, it was close immediately to the east of the hills. Aircraft icing conditions did not exist and turbulence, if any, would have been negligible.

On the morning of Aug. 16, shortly after 0330, a former air base, being on a hill approximately 600 ft. above sea level and about 21 mi. in a northwesterly direction from the scene of the accident, was disturbed by a plane flying very low over their



HISTORY IN THE MAKING—When two big Sikorsky H-10s landed at Wiesbaden, Germany, on August 8, following a multi-stage flight across the Atlantic Ocean, a new chapter was added to aviation history.

To the Air Rescue Service, which conducted the flight, this was an important proof of the ability of helicopters to operate on long-range missions. The test was made under severe weather conditions where the skill of pilots

and the performance of both of the aircraft were heavily taxed.

The successful completion of this historic flight was a major step in the evolution of the helicopter... already a craft of unparalleled usefulness and versatility. And it hastened the day when big helicopters of the future will be available to fly anywhere in the world, to perform their multitude of useful services.

SIKORSKY  **AIRCRAFT**
BRIDGEPORT, CONNECTICUT
ONE OF THE FOUR DIVISIONS OF UNITED AIRCRAFT CORPORATION



SHELL AIR QUIZ

Question:

What non-tropical flower grows its record in sales to swift air transportation?

Answer:

Daily flights from Hawaii have now enabled low-east orchids to be as accessible to American women as their neighborhood florist.



SHELL OIL COMPANY

20 WEST 39TH STREET, NEW YORK 18, N. Y.
100 FIFTH STREET, SAN FRANCISCO 6, CALIFORNIA

Question:

Which Aviation fuel in the U. S. A. today flies the most air freight?
... the most passengers?
... the most oil sold?

Answer:

SHELL AVIATION FUEL

home. Getting out of bed, they see through a window the blinding lights of a low flying airplane headed in a westerly direction. The plane continued in this direction and out of sight and out of mind forever. When they awoke the plane had gone. It seemed to have landed well beyond their range of hearing. Not until after three or four days were they known to have been in this area.

Capt. Lewis Reed Powell had been engaged in aviation for a number of years and had accumulated 7,741 hours of flying time when he became gravely ill on October 10, 1951. He was admitted to a private clinic, The Mayo Clinic, Rochester, Minnesota, 6000 C St. He was named Aviation Cancer Patient Rating No. 44554 in Dec. 1945. This rating was advanced Dec. 23, 1951, when he had completed a rating and treatment check. A D-57 aircraft given him by a CAA designated flight instructor.

The first attack suffered by Mr. Powell on May 18, 1951, was of such severity that his physician immediately sent him to a hospital in an ambulance, under oxygen. The condition improved sufficiently for him to be taken home by ambulance on April 25, 1952, following treatment to his lungs and liver. He continued to have frequent and severe attacks, following which, although very slow and gradually improved. He remained under medical care as an office patient until December 1951, and was last seen by his physician on April 23, 1952. His physician stated he had undergone a complete treatment and was in excellent condition.

On Sept. 2, 1951, Capt. Powell visited Dr. Francis C. Hering, the CAA designated medical examiner from whom he usually took his pilot physical examinations. Although Dr. Hering found no physical damage to his eyes or eyesight, he recommended that Capt. Powell not return to operation. Capt. Powell had a request to operation stated that he had had a heart attack since his last CAA physical, the examiner told him he could not issue a medical certificate in the winter unless he were a member of the CAA Regional Medical Office. Capt. Powell was later reexamined by another physician and a letter from his present physician

for forwarding to the CAA Regional Medical Office.

Upon receipt of this information the CAA Regional Medical Office, Dr. Paul M. Ellis, advised that he be given the CAA Medical Certificate of Health, No. 100-1000, and received the following reply dated Oct. 25, 1951: "The case of Lewis Reed Powell, aged 41, shows definite evidence of prostate cancer of considerable extent and definite history. I believe that any of these cases should be considered as a case of disqualification rendering Mr. Powell unfit."

Dr. Ellis then wrote Dr. Hering as follows on Nov. 14:

"This letter is intended to complete your record for Mr. Lewis Reed Powell."

In a memo dated Nov. 14, 1951, Dr. Hering advised that Mr. Powell, like others in Capt. Powell's case, had a definite case of prostate cancer.

Mr. Powell has spent considerable time trying to earn money to pay his medical expenses, which have been quite high. He was not successful.

I believe that he will do this.

Mr. Powell is completely sympathetic with Mr. Powell's accomplishmed, courageous, heroic, and skillful performance.

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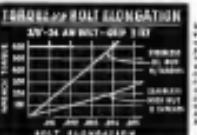
I believe that he will do this.



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- Ideal for standard and power wrenches!
- Manufactured in various materials!



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caused a first-class medical certificate, dated Sept. 1, 1952, with the limitation, "Valid for Company Check Pilot Duties." When Capt. Powell was examined on May 14, 1952, he stated in his medical certificate, "Dr. Herren again denied me physical disabilities but because of the pilot's health history, issued a medical certificate with the same limitations as before."

Mrs. Powell, widow of Capt. Powell, was unable to verify the exact date when Capt. Powell became physically unable to fly. However, her statement was taken later in which she stated that both she and Capt. Powell were well aware of the limitations on Capt. Powell's medical certificate, as was an officer of another irregular carrier for whom Capt. Powell made frequent trips to the States. She stated further that Capt. Powell told her he was

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AIRCRAFT
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more flights as copilot—first as C-46s and four in DC-3s, then flights as co-pilot—first as a C-46 and then in DC-3s, and two flights as captain, both in C-46s. On Aug. 2 he passed his segment and ratings check in the C-46, given by CAA Inspector William H. Butler, with a below average grade of 78%, and on that date was upgraded as captain by Robin Airlines.

From Aug. 3 to Aug. 10, the date of the accident, Powell made nine flights as captain in C-46 equipment. With the exception of two trips between Burbank and Oakland, all of his flights for Robin Airlines were between Burbank and Kenny City. All of the passenger-carrying flights made by Powell were economy class, he having been told that economy was the intended class to passenger charter planes.

Company officials testified that prior to the accident, this was not aware of any limitations on Capt. Powell's medical certificate, although they had examined his pilot papers and those of other pilots for Robin Airlines before giving Powell his C-46 segment check on Aug. 3. Testified that he, too, looked at Powell's pilot papers, including his medical certificate, and was aware of no medical limitations. He stated further that he was under the belief that all that was needed for a medical certificate was that it would be issued.

On Aug. 11, CAA Aviation Safety Agent G. O. Tracy saw a small check of Arnold on a flight on which Powell was a crew member. He stated in his report that Powell did not present the required medical certificate. Mr. Tracy did not know if the Board's medical investigation holding but a statement was obtained from him later, in which he stated that he examined Powell's medical certificate during the trip check and noted no limitations. This is understandable, as medical certificates are dated when issued and are not usually demonstrated that a medical certificate can be folded and placed as a container that while all other pertinent information can be easily read, that portion relating to limitations can be concealed. In addition, the specific word "normal" in the limitations was such as to not achieve clearly and unambiguously the fact that it was intended to be a less serious to flying safely as a check pilot and as an other report, had at least one of the limitations been present, it is reported, as to have been sufficient.

The lawyer for Mr. Tracy of the Civil Air Regulations is of the view that where a pilot's experience, ability, and judgment are acceptable for physical deficiency. However, no account of experience, ability, and judgment can be acceptable for an experience which is not normal and which is not fully incorporate the pilot. Hence the finding required by Section 208 before a waiver is granted could not be properly made in this case. We have, however, requested the Administrator of Civil Aerapeutics to take specific steps to prevent recurrence of such a situation as arose in the case of Capt. Powell.

According to testimony of Dr. Elie, the rating CAA medical officer of Region VI, the extent of the limitations placed on this medical certificate was to restrict Powell to company check pilot duties only and he was not to be solo or pilot in command, or as a copilot. Capt. Powell was fully aware of



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Drawing of J-M Goetze metallic gaskets used as inner and outer nacelle gaskets on jet engine nacelle frame.

case of the accident, out of three, however, the weather was clear. Much of Captain Powell's flying experience had been acquired on the Los Angeles area and he was familiar with the terrain. Only 1,000 feet of the accident site was visible, the terrain is relatively low, and had the aircraft been in this area, a visual approach might have succeeded. There is no excuse for such an approach to have been attempted; however, as view of the proximate conditions of the flight, the emergency procedures and the flight and ground factors available for the ILS approach for which the right half been cleared.

On Mar. 22, 1951, the Administrator filed a complaint with the Board requesting review of the accident and the emergency certification held by Robin Airlines, Inc. On Apr. 15, 1951, after the matter was heard, the Administrator issued an emergency suspension on that certificate and on June 17, 1951, the Board confirmed the emergency suspension pending final decision at the investigation proceeding.

FINDINGS
The cause of the accident is the loss of all available evidence. The Board found that:

The carrier was operating under Air Carrier Operating Certificate No. 6,272, issued by the Civil Aeronautics Administration on Dec. 18, 1951, to Robin Airlines, Inc.

The aircraft was properly certified as an airworthy condition and loaded within its certified gross weight at circuit weight but for continued flight at the time of the accident.

Capt. Lewis E. Powell seemed to have used pilot on the flight and was properly qualified for the aircraft. He held his medical certificate, although he was fully aware that this limitation restricted his flying activities to company check pilot duties only.

Capt. Charles K. Wadsworth was properly certified for the aircraft. He had the flight instrument rating and the flight time required prescribed under Section 42.45 of the Civil Air Regulations.

The flight was not conducted as recommended with the ARTC approach, as that it descended considerably lower than the minimum altitude prescribed by the ARTC. Reasons range from "Drowsy" to "overconfidence."

The flight was in clear weather until reaching the ILS, which were clear on the east slope but in fog to the west. When flying into Los Angeles International Airport, was unable to follow the ILS approach as the flight had been cleared, but was not satisfactory for a visual approach.

PROBLEMS CAUSED

The Board determined that the probable cause of this accident was the action of the pilot in suddenly descending below the minimum altitude for which he was cleared, and attempting to approach at an altitude too low to follow the terrain.

BY THE CARDS

*JF DONALD W. INTERD
JF OSWALD REYN
JF JOSH LEE
JF CECAN GUINEY
Joseph F. Adams, Member, did not participate in the adoption of this report.*

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Answers for Chapter 39



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AVIONICS



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ANDB to Try 'Poor Man's GCA'

British device may answer need for copter landing aid; uses single antenna radar with radio DE.

- 10 -

The Air Navigation Development Board will take delivery this month of new low-cost British ground-controlled approach radio to evaluate usefulness as an instrument landing device for aircraft.

The British GCA can be mounted in a small trailer and is designed to permit a degree of 'localiser' and the angle of its 'glide-slope' approach paths to be quickly changed. This feature makes the device particularly attractive for making helicopters a potential

loss to the front lines in combat areas. Army, Marine Corps, Coast Guard and civilian helicopter operators are expected to follow the ANRIB rules closely because of the pressing need for helicopter employment in landing zone. One example of the need is the starting date of the 1970s integrated airport to support helicopter aerial service in the New York area had to be delayed because of weather.

For Man's GCA-AN3D has purchased for \$15,000 one of four prototype equipments built by E. K. Cole Ltd. of England. This figure includes spare parts and the services of a British technician who will accompany the

approximately) as smooth as the entire beam. This is the technique used to actually "acquire" the approaching air-borne, or heterospore, in a smooth

To complete the sequence, the operator then normally hits the radar buttons or switches until he gets a maximum signal return (echo) on his scope. Once this is done, the approaching aircraft is centered both on the scope and the cursor in the radar box.

4-Stripe Presentation—The EBCO set gives the operator a 4-stripe type of radar presentation. The target appears as a "double-lined" target with a horizontal (X-axis) displacement from the cursor determined by the target's distance from the antenna. A scale along the radar scope enables the operator to convert the X-axis displacement ratio into miles per mile.

Because the A scope doesn't show the plane's azimuth or elevation position (in a PAR scope), another means must be provided to give the operator the visual take-down information.

Indicating Lights—As long as the operating plane is centered in the radio beam, the azimuth and elevation position of the radio antenna staff is an indication of the airplane's azimuth and elevation position relative to the antenna, and as such relative to the runway. Four electric switches close for azimuth antenna position and two for elevation antenna position; operating lights adjusting the radio scope to show whether the plane is on the approach path.

If the capsule, and hence the radio antenna is above the selected approach path, the "Up-down" switch will be activated and its indicating light will be illuminated. The "Up", "Up-left", and "Up-right" lights are activated similarly. If the capsule is on the correct path, all lights are dark. The GCA system provides information to the pilot over conventional VHF communications equipment. The four switches can be selected

climbed until it is desired to shift the approach direction or glide-slope

Keeping Phase Consistent.—As the air density's azimuth or elevation position changes, the operator must reposition the radar antenna using the manual controls provided. (EKCO has experimented with foot pedals, handwheels, and joystick-type controls.) The operator must continuously adjust the azimuth position in both azimuth and elevation to obtain the greatest return signal, as evidenced by maximum height spike height on the A-scope. A FAR operator, on the other hand, is not concerned with these details.

ANDB wants to find out whether these additional duties impede a smooth functioning of the GCA operation. During



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FOOT PEDALS and hand wheel. Radio range or party hidden by shield

a demonstration for ANDB that number in Britain, a new operable took over the EKCO radio after a short period of in vibration and didn't seem overly handicapped by his duties according to an ANDB spokesman who says the disaster stations

Another potential shortcoming of the FDX equipment is that the indicating lights don't give the operator or the pilot an indication of how far the aircraft is off the desired approach path. The pilot only knows that he is "on" or "off." He doesn't know how much correction is necessary to get back on the correct path.

Whence, PAEs permit the simultaneous fall-down of several assets, the Borsch equipment has handles only one engine at a time, because the



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petroleum, Esso marketers were also the first to develop and expand the use of the Hydron Rotating System. Today, even in such widely separated airports as Gander (Canada) and Davao (Mindanao), the Esso sealed and pressurized fuel, fuel, dependable petroleum service is still available.

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With so broad a beam and lower power the EKCO GCA could not be expected to give control as precise as PMR even under optimum conditions.

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Howard Collins, manager of the Southend (England) Airport at which the EKCO equipment was tested in more than 1,000 GCA approaches, will accompany the set to the U.S.



Slidewire Pot

A new type slidepot potentiometer capable of rotation through 3,600 deg. (360° revolution) and with unlimited linear resolution is now available, announced by G. M. Cottrell & Co. Called the "Speedpot," the device is available in five standard resistance ranges between 500 and 2,500 ohms linear in comparison to seven resistance ranges in previous "A" series slidepot. Cottrell says the new "exceptional feature" will meet operating space under 100 accelerations, and function at temperatures of -50°C to 71°C. The device weighs 4 oz. and is said to be capable of withstanding a million revolutions at 200 rpm.

G. M. Cottrell & Co., Inc., Passaic, Calif.

Static Converter

A six stage converter for submarine use can supply up to 400 kw. of 3000 rpm power from a 215 x 400 cycle motor, an acular, Mayr-Elektric Co., announced. Weighing 91 lb., the converter is designed to hold output voltage constant within one-third of one percent from zero to full load and for input voltage fluctuations of 10% to 15%. Measured over 1000 hr. the unit will operate at -57 to 55°C and withstand salt and freshwater test AN-E-79, according to the acular. Box 450, Red Bank, N.J.

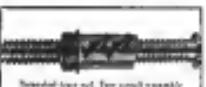
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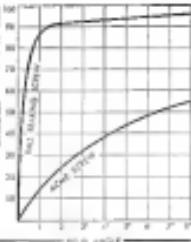
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► **Transistor Telephone** adding an *emitter follower* to the conventional three-element *pentode* transistor, Bell Laboratories has improved the transistor's operating frequency by a factor of 10. The new *transistor* circuits have been *operated* at wave frequencies of 150 mc., E. G. Schramm of Bell Labs, research, told a *radio* audience in New York. The fourth *electrode* is connected to the *transistor* base opposite the *existing* base electrode and is *appropriately* biased to *cause* a *current* to flow between the two base electrodes. This *biasing current* lowers the *base*, *emitter*, *cutting* *distance* *transistor* *base* and thus *increasing* the *mobile* *frequency range*.

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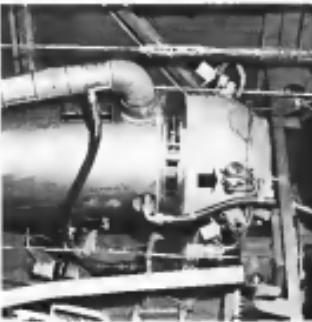
should know about "How to live off books and used records" from the *Non-Sub-compendium*. Ask for any of the following books: *Forming Aids*, *Business*, *Beginning For Adults*, *Get On The Go*, *Managing For Adults*, *Anger*, *Adult Abuse* and *Its Effects*. Several others are available as used educational programs.

小野洋子 (Yoko Ono) 在 1964 年發表的《Plastic Ono Band》。

Fenwal heater control used on HUP Helicopter



PIAGET'S VERSATILE HUP HELICOPTER, here shown rescuing an aviator from the sea, serves a number of purposes for the Naval Fleet. Used for anti-submarine patrol training, it also provides search and rescue services. Standardized controls are designed to operate under severe climatic conditions. Automatic heat control of the HUP's insulation, equal pressure cabin is maintained by Fenwal THERMOSWITCH™ units.



FENWAL THERMOSWITCH UNITS are installed on the HUP's heater, shown here. These units help make possible automatic, instantaneous temperature control and pressure regulation or release these aircraft components because they are used as safety and control devices in many aircraft applications.



THEIR VIBRATION test equipment, above, produces the vibration conditions found in helicopters. The test above, on Pratt and Whitney turbines, is conducted as all types of Fenwal Aircraft Controls are vibration proof per specification of all Fenwal vibration products.



EXPLODE ELECTRICAL CONTACTS of a Fenwal THERMOSWITCH model can be seen in this close-up view. The contacts are made of a high temperature or ceramic material which resists temperature changes, thus sealing or breaking the contacts. Fenwal units are compact, highly resistant to shock, vibration, and corrosion and extreme temperature and humidity conditions. For more information, write to: Manager, Aeroplane Controls, with FENWAL, INC., 1000 Park Avenue, Boston, Mass. 02116, U.S.A.

THERMOSWITCH™
Electric Temperature Control and Detection Devices
SENSITIVE...but only to heat



EQUIPMENT



BEFORE Maintenance work being performed while the gear valve is open, taking separator out of the gear.



AFTER With the Stratos separator unit in the left setup, 75% of the insulation is removed and drained into the gear.

Separator Spins Water Out of B-47 Air

Stratos centrifugal unit, developed for Boeing, is designed to keep cabins fog-free in fast descents.

By George L. Christian

A centrifugal air moisture separator, first to be used in aircraft, is being tested at the Boeing plant in Seattle division of Fairchild Engine & Airplane Corp. for Boeing Airplane Co.'s B-47 bombers.

Development of the unit, conceived by R. E. Weller of Boeing, was begun as a para research project at Boeing, since no such article was available on the market. Later the company asked Stratos to continue refinement to produce the unit.

High Efficiency—Stratos engineers, who produced the nucleus at Boeing's request, are proud of the average efficiency of 75% water removal (maximum efficiency of 85% can be obtained). They say their Stratos unit is especially efficient at low altitude, where insulation is causing as far as 10% loss.

In some cases, pilots have reported fog in the cockpit that they couldn't read the instruments and were unable to tell the plane's altitude altitude, or altitude. Under such conditions, it is great, if it is especially efficient at low altitude, where insulation is causing as far as 10% loss.

Another very real problem when air is sent to the cockpit suddenly expands, when pilots make the mistake for

inert in jet aircraft, prevent pilots from seeing differences between inside and fog. In at least one instance a jet fighter pilot referred to the losses because his ship was on fire. Later it was ascertained that what he was referring to was fog in the cockpit. The incident occurred at 350 ft., and both pilot and plane were lost.

The Stratos also removes some of the oil from air entering cockpit or cabin, if engine oil is present. And in landing cockpit humidity low, less heat is required to defog the windshield.

The Stratos separator may be installed in any position—vertical, horizontal or diagonal—without impeding its operational efficiency, its engineers say.

The separator has a disadvantage, according to F. Weller. Stratos separator is not an efficient way to reduce the efficiency of the aircraft's air cycle machine (dehumidification system) by holding up as much as 4% in fuel burn rate.

Engineering Details—Here is what Stratos engineers did, in consultation with Boeing design requirements, to the Model AP50-1 air cycle machine for

B-H

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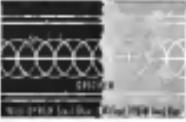
making dies and templates

Directly leads to a right off the bench ready for the layout in a few minutes. The Steel Blue background makes the outlined legend lines show up in sharp relief, and at the same time increases metal clarity. Increases efficiency and accuracy.

Write for full information

THE DYKEM COMPANY

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SIRATOS MS601 unit weighs 3.5 lbs., can handle 60 ft. lbs. of air



PLASTIC MODEL of MS601 mounts separate from working parts

readily produces exhaust, logging. Maximum cooling is obtained because when air-turbo valve is closed, air is bled from the jet engine gas in the cooling turbine.

When air-turbo valve is open, the turbine discharge air bypasses the separator, thus creating an appreciable pressure drop. Turbine efficiency is at its maximum then.

The air-turbo valve also permits pilot to bypass the separator when air plane operates in dusty or dirty conditions which might plug the separator.

From Dragoo-The air separator separator is composed of three major case pieces. Described in order, from air inlet to air outlet, they are:

- **Fog separator:** Consist piece of Orbits fabric collects minute particles of water which would log up the valve. They build up as one unit, differential pressure deliquesces them.

- **Hitting assembly:** Has two parts. The first, a valve, which automatically directs droplets of water released by the separator, against the outer wall of the separator. Second part, the jet valve assembly, draws air/droplets in the proper direction. The nozzle, orifice and the driving surface are mounted on a common shaft. They are fabricated of sheet metal.

- **Base housing:** Water droplets against the separator walls is collected in the base housing, then piped overhead.

Under experimental conditions of 125 gpm/sec. of entrained moisture, the machine attains its maximum efficiency and separates approximately 2 lb./min. of water, for a maximum droplet size rating of 50 ft. from air.

- **Easy On/Off:** Simple, ingenious en-



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Model 944001 demonstrated a Crew Seat to meet rigid military specifications and which could be subsequently modified to meet a wide variety of special requirements. Military Personnel insisted on adaptability, greater comfort, improved styling and a standardization of parts and sub-assembly details.

WEBER ADAPTS SEATING INVENT TO WORK. A Crew Seat was developed to meet the requirements of a wide variety of aircraft modifications, including two different applications. Built to USAF Specification 84099, a flight modification qualification for MIL-S-2553. The lower seat has centralized 560° swivel positioning with stops at 45° increments. Weighting 47 lbs. this pedestal type design has 5° of Vertical Adjustment with maximum height at low position. Floor track adjustment travel of 6". Adaptability was the keynote presenting these variations.

SPOT Hermetically Sealed, Solder Type, Model Type No. 61758, AM3100-1

SPOT Hermetically Sealed, Screw Terminal Type No. 61759, AM3201-1

SPOT Sealed AIR Connectors Type No. 61748, AM3104-1

SPOT Hermetically Sealed, Solder Terminal Type No. 603103

SPOT Sealed AIR Connectors Type No. 61757, AM3202-1

SPOT Hermetically Sealed Screw Terminal Type No. 61749, AM3203-1

SPOT Sealed AIR Connectors Type No. 61758, AM3104-1

All the above Safety Performance characteristics are as follows:

• Operate rated.

• 10 hours, including 10% of rated time, at 100% rated current.

• 10 hours, including 10% of rated time, at 25% VDC.

• 10 hours, including 10% of rated time, at 10% VDC.

• 10 hours, including 10% of rated time, at 5% VDC.

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FOR AIRCRAFT

CONTROL CIRCUIT RELAYS

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AN, AF AND NAF APPROVALS: Illustrated above are but a few of the complete line of Leach hermetically sealed and sealed control circuit relays for aircraft.

Here are four of many important reasons why major aircraft manufacturers specify Leach relays: (1) they are reliable, dependable, (2) to meet military performance standards, (3) for leading design performance, and (4) because they're built to exacting standards. Many modern aircraft are equipped with Leach relays from day one.

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post negligible maintenance for the an auxiliary separator—except for occasional replacement of the separators—because the machine contains only one moving part, its light weight assembly weighs only 0.7 lbs, and its rotating assembly turns at a relatively low speed—average is 9,000 rpm.

► Early Problems—F. V. Smith, Stetson's mechanical manager of auxiliary separation, solved these problems through Stetson engineers when they undertook development of the air motion separator.

Alternate measurement of the mass flow content in air is a tried business. Stetson personnel worked up four independent methods of measuring separator efficiency before deciding which was the most accurate and least susceptible to human error.

Stetson engineers found it difficult to isolate the unit to different uses, and much research was devoted to learning which dimensions were to be controlled. Separation control is to hold a family of separators to cover the complete range of air cycle rate variations.

► Production Plan—Currently, Stetson is in production on the MS600-1 separator.

Model MS601 will be next (capacity of 20 lb/min. of air), the lighter aircraft. Basic dimensions are: length, 13.6 in.; maximum diameter, 5.8 in.; inlet and outlet sizes, 2.5 in. The MS601 should be available early next year.

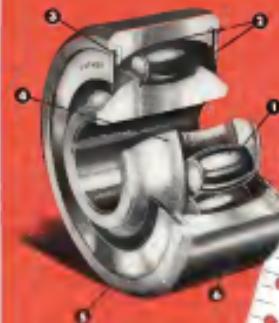
A third model, MS85, is contemplated. This machine will be 17.5 in. long, have a maximum diameter of 7 in., and inlet and outlet sizes of 3 in.



SLIP-PROOF FOOTING

A new type of rubber casting, predicated and copyrighted by Leach, using a unique new bonding or slip-resisting technique, is now on the market. Pacific Rubber, Manufacturer of coated rubbers, the casting is 7/16 in. thick and comes in rolls 24, 48 and 45 in. wide. Traffic-Tread is made by American Mat Corp., 2213 Adams St., Elkhart.

Here it is



the
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airframe control
bearing
DSRP series

another FAFNIR first...

DESIGN ADVANTAGES

Fafnir DSRP Series Tapered Bearings are scientifically engineered for full (30° total) misalignment and high capacity, consistent with the all important need for maximum weight and space.

Design advantages include simple construction and fewer parts — ideally balanced for oscillatory service in aircraft control systems. Elimination of built-up shoulders induces inaccuracies and deflections in mounting — reduces longer bearing life.

The creation of this series is another example of the Fafnir "attitude and optimism" . . . a way of looking at bearing problems from the aircraft designer's viewpoint, on up to coming up with the right bearing to fit the need precisely. The Fafnir Bearing Company, New Britain, Connecticut.

DESIGN ADVANTAGES

• Self-aligning capabilities reduce bearing sizes for certain applications.

• Self-aligning action is more effective than other bearing types in certain applications.

• Precision bearings with greater precision than standard bearings.

• Clean bearing design reduces bearing life.

• Standardized bearing sizes reduce cost.

• Standardized bearing sizes reduce cost.

• One piece taper and outer cups.

Send for your copy.

New bearing sections, complete descriptions, dimension diagrams, load rating tables and performance graphs.



FAFNIR

AIRCRAFT BEARINGS

MORE COMPLETE



MADE IN AMERICA

Mobile Units Speed Engine Testing

Two new self-propelled mobile engine testing units that are expected to save 1,000 man hours a day and cut down some complaints have been developed by Oakland Aircraft Engine Service and are operating at Oakland, Calif., Municipal Airport. When a third unit, now under construction, is completed, the total cost will be \$35,000, considerably less than the minimum cost of a fixed cell.

Assembled on mid-downs mobile trailer bases, the units are equipped with

instrumentation for checking engine performance, carry their own fuel load, and can be driven on the highway for a look at any point accessible to ordinary vehicles. With quick-change fittings a complete engine change can be made in 45 minutes. Wheels could easily be replaced by half or full tracks, for mobility.

By being able to move away from the congested area of an airport, the units can operate 24 hours a day without disturbing workers by their noise. The mobility of the unit also makes it possible for engine to hear the word of all times, a help to accurate testing.

The units are adaptable to various types and sizes of engines and can be

developed to absorb one horsepower available in the propelling engine field. At present, the first unit using 1,000 and 2,250 hp engines has power DHC-4 and DHC-6 commercial aircraft.

Similar self-propelled units are in service at Los Angeles International Airport, when Western Air Lines uses a converted school bus, and at Stapleton Field, Denver. Continental Air Lines has a pair of converted buses.

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Pressure Switch Has Piston Element

A new piston type pressure switch, designed by an engineer to be an improvement over conventional diaphragm, bellows and displacement types, has been developed for a variety of aircraft applications by Belfek Mfg. Corp.

The unit is being used in Douglas Aircraft Co., in its Skyray F4D-1, AID Skyhook and F4D Skyray. Mac-

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Vacuum Pumps, Oxygen Regulators, Air and Oxygen System Accessories



MODEL 10410



MODEL 10411



MODEL 10412

of aluminum die casting and stainless steel, its sensitive operation through the wide range of temperatures encountered in military applications makes it suitable for warning systems, for use in sequencing circuits, in interlocking controls and other refined applications. Balanced closure. The new series is adaptable to medium and high pressure systems employing hydraulic fluids, water, air, gas, and compressed air, moisture, according to the needs dictated.

Gross weight varies from 14 to 36 oz., but envelope size remains the same, the main spring wire being the only part that varies to prevent operation in any one of eight ranges from 125 to 7,500 lb.

The new pressure switch is inherently adjustable within any single range. The switch has a low "on-off" differential pressure of all types and a "double" calibration, maintaining settings under 40G load.

Brickell Mfg. Co., 3119 State Ave., Los Angeles 39.

OFF THE LINE

A paint that apparently will not melt, invented by Skellydrol, the Missouri petroleum-based hydraulic fluid, has been developed in Holland. To date, the fluid's paint-resistant ability has been a major headache to military paintmen. Skellydrol's paint-resistant qualities have been found to be as good as the paint itself, but the cost is high. No price was quoted for the Dutch product, made by Skellane Co., Wurmond, Holland.

Douglas Aircraft Co. has authorized Co-See Chemical Co. to use Douglas-developed sealing methods on DC-4 integral fuel tanks. A Douglas technical representative will instruct Co-See personnel in the processes and techniques, using DC-411 material. Douglas says that it also has authorized Co-See to incorporate Douglas tank access door construction.

Zap Auto and Manufacturing Equipment Co. announces that it is the first vacuum equipment manufacturer to receive Civil Aeromaritime Administration approval. The Zap company's headquarters are at Los Angeles International Airport.

Stanton's mass flow valve CPT15-8D has an actuation time of 1 second. Of the 2,500 units built, not one has ever been returned for service, according to Stanton engineers. The valve is used to Lockheed L-1011 jet transports. Used also have been in a straining valve.

AIRPORT WEEK December 8, 1952

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AND ASSEMBLY TIME

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MAS 279 .179" Diameter Head—.179" Diameter Head



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NEW ST. ISIAK building has two engine test cells operated from one control room



NEW TWIN-WASP engine set up for Swiss test. Note odd propeller tips (arrowed)

Swiss Complete New Test Plant

Switzerland's new engine test building, completed after four years of planning and construction, accommodates two cells—one for testing reciprocating engines up to 5,000 bhp and the second for gas turbine engines. Tests are operated from a control coated room, separated from the cells by triple-disk glass panes installed for observation.

Here are some highlights of the test rig:

- Engines are suspended on rubber-cushioned steel cables to stop vibration from being transferred to the building structure.
- Thick thick pieces of glass, spaced 5 in. apart, help keep noise in control room down.
- Special instrument in the control room records the slightest trace of inci-

tion particles in engine oil systems.

Engines, including propulsive engines, have been started and oil temperatures for sole operation of the engines have been satisfied. Systems are automatically shut down in case condition which might damage the engine area. Typical examples are range of temperature, low or pressure and engine overspeed.

The building structure, located at Kloten Airport, Zurich, is 127 ft long, 66 ft wide and 25 ft high. It is thoroughly soundproofed and an efficient air conditioning system supplies 275,000 cu. ft. of air to the control room every hour.

Testing and sound proofing equipment were supplied and erected by two British firms.

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Photo Courtesy of Wright Aeronautical Division

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Airtemp and Precision Mfg. Co., 315 E. 95 St., New York 28

Loop Improves ADF

Higher accuracy and faster response are among the advantages claimed for new Ferris Dynamic loops being produced by Lear, Inc., for use with radio navigation equipment in executive aircraft. Component is designed for operation with firm's ADF 14 radio compass, and can be modified for use with ADF-12 Oscillators. It has ferrite core loop with electrical quadrantal error correction.

Learjet division, Lear, Inc., 11986 W. Pico Blvd., Los Angeles 66



Obstruction Light

Double obstruction light for placement at airports or along air routes comes from Great Britain's General Electric Co., Ltd. Two specially designed and packaged glass domes give symmetrical light distribution with maximum intensity 10 deg. above horizontal. Body is silicon-aluminized steel casting. Lamps are 75 watts.

General Electric Co., Ltd., Marlow House, Marlow, London W. C. 2

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Complete on-the-ground, all-weather comfort for airline passengers is achieved by this new mobile air conditioner by the Airtemp Corporation.

Already chosen by Chicago and Southern Air Lines, United Air Lines and Capitol Airlines, the unit is finding ready acceptance by the industry for its dependability and ease of operation. Another example of South Wind leadership.

—direct to the plane's own ventilation system. Stewart-Warner supplies the electric fuel pump and instruments, as well.

Already chosen by Chicago and Southern Air Lines, United Air Lines and Capitol Airlines, the unit is finding ready acceptance by the industry for its dependability and ease of operation. Another example of South Wind leadership.



Left-hand panel of truck with engine door open for inspection or service. Being in close to compressor, the instrument panel on the right carries Stewart-Warner liquid level and temperature gauges.



Marine application. Only the dangerous section of the heater is visible. The South Wind heater itself is as compact as that of a car completely inside the dash, yet supplies up to 200,000 BTU's of heat to cabin and cockpit.

Address inquiries to the South Wind Div., Stewart-Warner Corp., Milwaukee 7, Ind.

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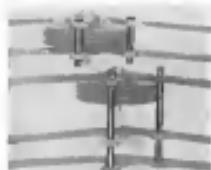
Midwestern Model 570 Oscillograph

This occasion, rugged instrument was designed for industrial and laboratory testing requiring numerous channels, each of which should have close definition for accurate reading. It will record up to 36 channels of separate data on paper or film 12 inches wide. Dimensions are $14\frac{1}{2} \times 18 \times 19\frac{1}{2}$ (including base). Weight is 48 lb. (including base). For use in the seismograph Maltese cross offers a wide variety of precise galvanometers with unclamped natural frequencies up to 3300 cps. Write for complete catalog and galvanometer specifications.

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A new quick-disconnect safety guard pin with National Aircraft Standard approval does away with use of lock pins. Spring clip on pin depresses while it is being pushed through bulkhead, then snaps out on shoulder of hole to

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Central Ave., Los Angeles 17.



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"Photograph Records in Practice IFR Clearance" is a set of three 78-mm transparencies designed to help pilots overcome the confusion of biegled airspeed indicators.

This method provides realistic instruction available somewhere at any time—not just during IFR weather—for the student pilot, master of the record classes. Old methods have been far the instruction to and hypothesized

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"To meet the dusty day, to seek and destroy the enemy . . . as all weather . . . requires swift performance, the latest electronic equipment and . . . equally important . . . freedom from risk."

A. W. Chapman's research findings help give the wings to F-14. A specially designed program timer controls three phase current in sequence through ten electrical heating elements in the leading edges of wing and tail.

The application of specialized A. W. Heyton mixing equipment solves the problem of simultaneously advancing grain, feed distribution and pork house consciousness. There is efficient delivery of maximum weight.

A wide range of tuning problems subtainty and civilian aircraft are being solved with power A. W. Hydrolite timers, certain the great

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clerkship to his students, or to wait for bad weather to listen to a sport control tower giving strict IFR clearance.

The second section 25 transcriptions of airmail classes in many cities through the country. The instruction is *not* to customs to CAA-approved procedure.

Hyde Aircraft Supply Co., Dept. B, Hyde Airport, Herkimer, N. Y.

Seraper Rings

Seraper rings for piston parts and engine components are being made to AN 6231 requirements by Gogebic Iron.

The rings are designed to remove set, dirt, dust and other foreign matter, possessing extreme wear of O rings and precision parts. They are available in sizes from 1 to 13 in. inside diameter.

Approved under Spec. MIL-S-5249, the Seraper rings, called Super Seats, are said to exceed wear requirements by 300%.

Gogebic, Inc., Dayton, Ohio

ALSO ON THE MARKET

Hi-tension ignition cable for airborne and ground use is selected first to meet Bureau of Ordnance approval under Spec. MIL-C-3161 as Type 1 Grade 2, Class 2. Approved under Grade A and is in addition to other certifications already received under the MIL spec for cable of this type, a 5 wire gauge consisting of a stainless steel conductor covered with synthetic rubber insulation, a glass-enveloping lead and overall low temperature sheath. Cable is made by General Electric Co., Bridgeport, Conn.

Product selectivity. New data sheet describing best values of using temperature insulating liquid. Tracing and various other data are available as a booklet from Temp. Corp., 11 W 25 St., New York. Japan guide on fire extinguishing equipment and accessories put out by Eye-Ear Co., Dayton, contains useful general information. A drafting template to use twice when drawing H-524 seats may be obtained from El Sheet Metal Tool Co., 1524 Bellanca Ave., Los Angeles 5.

A 24-mm. version of the Safr B-57 35-mm. center spark plug has been put on the market by the Safr Sales Div., U.S. Quar. Tlc. Co. Launched the B-57, the plug was designed for and is CAA-approved for installation engines according to the manufacturer. The B-57 is resistant to lead loading and reduces radio interference. Safr Sales Company, 317 4th St. N.E., Detroit, Ohio.



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Hawthorne, California



AIR TRANSPORT

PNYA Predicts Mass Copter-Commuting

- Annual traffic by 1975 may exceed 6 million.
- Survey shows New York will need 6 heliports.

Helicopters will be carrying more than 6 million passengers annually in and out of Manhattan by 1975, according to issue than half the air traffic at Port of New York Authority's three big terminals at Idlewild, La Guardia and Newark. That great development of transport helicopter traffic it does not in a special long-range survey issued by Port of New York Authority officials.

Approximately 100,000 passengers are expected in 1975 by heliports in the metropolitan New York area, the survey predicts, revealing there is at least one heliport conveniently located in the Manhattan area.

► Heliports—At least six heliports will be required in New York area, three in Manhattan (two in midtown, one downtown), the others in Brooklyn, Newark and Staten Island. Another heliport will be required atop the main Post Office building in Manhattan to take care of all-mail copter traffic. It is estimated that landings and takeoffs from the heliports heliports will handle a total of 221 daily in 1975 to 637 daily by 1975.

At the start of passenger-carrying service, operators will face direct operating costs of approximately \$0.09 per available seat-mile, or about four times the present level for fixed-wing carriers, because the copters initially will be modified military designs. Later, larger but still relatively simple military types will provide lower costs at \$0.06-\$0.07 per available seat-mile.

1960-1975, specifically trained commercial experts will bring available seat-mile costs down to \$0.03-\$0.05. Scramble costs will go down still further with the advent of 30-50 passenger craft capable of operation at \$0.045-\$0.07 if powered by piston engines and possibly \$0.035 with turbine power.

► **Folding Rotor Blades**—Early design problems will include simplification to lower maintenance costs. For operation of restricted-area heliports, as those as airports, automatically folding rotor blades will be required.

In order to insure competitive fare levels with fixed-wing carriers, fares

Estimated Annual Helicopter Passengers New York Metropolitan Area

	Domestic, B	Intercity, B	Subtotal	Total
1955	225,000	75,000		300,000
1960	1,177,000	291,000		1,468,000
1965	1,371,000	1,274,000	3,645,000	3,936,000
1970	1,556,000	1,555,000	3,111,000	5,005,000
1975	1,683,000	1,746,000	3,016,000	6,425,000

Estimated Intercity Helicopter Letter Mail Both Directions—New York Area

	Domestic, B (in thousands)	Overseas, B (in thousands)	Total, B (in thousands)
1955	0.5	0.2	0.5
1960	1.4	0.5	2.5
1965	3.4	1.3	3.4
1970	5.5	1.9	5.7
1975	7.6	2.7	11

Estimated Helicopter Package Cargo Both Directions—New York Area

	Total 4th-Class Surface, B (in thousands)	Armed Division to Copter (in thousands)	Light Package Cargo (in thousands)
1955	230.64	0.5	1.0
1960	239.17	1.0	2.4
1965	247.62	1.5	3.7
1970	256.70	2.0	5.1
1975	263.90	2.5	6.6

basis, copter operation from the start will have to overcome new operational techniques and storage costs, the report points out.

► **Traffic Patterns**—To explore the huge transport heliport market that awaits transport helicopter operators in the New York area—more than 25 million people live within 150 mi of Times Square—highly specialized traffic patterns will have to be developed to maintain timetable performance.

Off-peak areas will separate fixed-wing and rotary-wing traffic and the latter's pods will suffice low-powered-motorized aircrafts and distance-cams using equipment, according to the study. Manhattan will be the financial point for much helicopter service. The latter factor will encourage growth of so-called aerials (in-and

long-haul) service. At present most long-haul flight of all airline passengers using Idlewild La Guardia Newark airports start at and then stop in Manhattan. During 1953 1954 it is estimated that airline passengers at these airports will increase by approximately 14.5 million. By 1960, according to the study, approximately 23.5% of the airline passengers who normally would use Idlewild will shift to copier service and some 10% of passengers using Idlewild will use copier. At the start, passengers will have to pay fares, possibly 70% higher than the

Padron Commuting.—The urbanous streets generally will be most attractive at first start to car owners and office bus drivers, who will pay fares save because the cost of travel summarizes the considerable savings in travel time. This travel time is expected to lengthen as more and more businesspeople complete theodus from the tightly packed city area and thereby cut into neighboring communities. The survey expects that half of the 1950 will add 50% more time to Manhattan from within a 33 1/2-mile area.

Helepoen also will take on an increasing portion of the local home mail and package cargo business. In the 1975-76 year surrounding Midwestern seaports will take on approximately 15% of the traffic carried by surface transport by 1975. And it is predicted that by the same date container will carry a volume of fourth-class mail equal to 7,200,000 of those carried by the railroad.

Indonesia Plans Airline Growth

第三章—問題與討論—

Melbourne—High priority has been given to a five-year civil aviation programme in Indonesia. Discussions are underway between the Indonesian government and KLM Royal Dutch Airlines covering the status of Garuda Indonesia Airlines with a view towards giving the country a larger role in airline development.

Greater emphasis is to be placed on developing inter-island services and construction of new airports and better communications.

Carriers carry approximately 28,000 passengers monthly on its routes, which extend to Singapore and the Philippines. Some 30% of the carrier's revenue is derived from cargo. Employment now is about 5,200. Its fleet is being expanded to 30 aircraft, 16 Comairs and the remainder de Havilland Herons.

Most of its planes are sent to Australia when they need extensive overhauls or repairs, but there are plans to build up domestic facilities.

Airfreight Needs and Problems

- Industry generally finds basis used at
 - Standard freight terms
 - Special plane-decking devices
 - For pooling of loads via domestication
 - Categories for light loads
 - Standardized rates for heavy loads
 - Shipping of light loads
 - But that still does not assist basis
 - Formerly long wait confirmation freight terminals adjoining passenger terminals
 - All-cargo airports want separate freight terminals at airports—but import packages can't be held until the plane arrives via domestication
 - Flying Tiger: West bid bid bid bid bid bid
 - Douglas Aircraft and others review
 - Pool of New York Airfreight agents
 - Standardized and bulk container
 - Freight forwarders want pre-pooling of loads
- Railway Express Agency wants
 - Lower basis
 - Military wants pre-pooling of even
 - Inter loads
 - Flying Tiger: same as pre-pooling
 - Won't work commercially
 - All-cargo flight are in the middle on
 - pre-pooling
 - Airlines want stronger plane decks for
 - Manufacturing want greater vehicles for
 - Loading heavy trays as plane decks
 - Flying Tiger: Low worth plane decks
 - United likes them but says they pay in
 - Flying Tiger: Compromised as
 - Land only equipment
 - Seaboard wants bigger planes with
 - 25,000 lb payload
 - Flying Tiger wants planes low to the
 - ground to load
 - Douglas Aircraft says freight planes will be
 - conventional

Airfreight Handling Needs Cited

Air cargo industry would like better ground facilities, but airport operators say carriers must set up spaces.

C-67, but even with the C-124, Conestolas, DC-3 and DC-4 types, and slightly higher than the C-46 and Fairchild C-119. Slopes would range up to 10 degrees for the Stratofighter in down three degrees for C-46 and C-119.

Once you have the deck, Olson cautions, *automatically* add 10 percent to the loading problem—concrete for lighter loads, vehicles for heavier ones.

The removal with docks, supported by specific material handling devices should allow loading, at a rate of about

The major problem lies between getting heavy equipment into the plane without disrupting the floor.

► Heavy Loads—Storage floors and gantry loading devices were both rooms considered—and unlikely will evolve.

Costello noted that Lockheed's new extruded magnesium 5005 on the 1049B and XC-130 seems a good investment. Flying Tiger Line has installed two such floors already on C-141s, with CAA approval of more than 400 per sq ft. Glass called for development of a magnesium floor.



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